GARDNER ON THE NUMEROLOGY OF DR. KHALIFA • WORLD SURVIVES ROSWELL HYSTERIA • USAF ROSWELL REPORT

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

Volume 21, No. 5 • September/October 1997

SPECIAL ISSUE

ALTERNATIVE MEDICINE in a SCIENTIFIC WORLD

ARTICLES BY

Robert L. Park
Barry L. Beyerstein
Wallace Sampson
Saul Green
Ursula W. Goodenough
Lynn McCutcheon

Published by the Committee for the Scientific Investigation of Claims of the Paranormal

09> 56698 80575 5

THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL

AT THE CENTER FOR INQUIRY–INTERNATIONAL (ADJACENT TO THE STATE UNIVERSITY OF NEW YORK AT BUFFALO)

AN INTERNATIONAL ORGANIZATION

Paul Kurtz, Chairman; professor emeritus of philosophy, State University of New York at Buffalo
Barry Karr, Executive Director and Public Relations Director
Joe Nickell, Senior Research Fellow
Lee Nisbet, Special Projects Director

FELLOWS

James E. Alcock,* psychologist, York Univ., Toronto
Jerry Andrus, magician and inventor, Albany, Oregon
Robert A. Baker, psychologist, Univ. of Kentucky
Stephen Barrett, M.D., psychiatrist, author, consumer advocate, Allentown, Pa.
Barry Beyerstein,* biopsychologist, Simon Fraser Univ., Vancouver, B.C., Canada
Irving Biederman, psychologist, Univ. of Southern California
Susan Blackmore, psychologist, Univ. of the West of England, Bristol
Henri Broch, physicist, Univ. of Nice, France
Jan Harold Brunvand, folklorist, professor of English, Univ. of Utah
Vern Bullough, professor of history, California State Univ. at Northridge
Mario Bunge, philosopher, McGill University
John R. Cole, professor of anthropology, Univ. of Mass. at Amherst
F. H. C. Crick, biophysicist, Salk Inst. for Biological Studies, La Jolla, Calif; Nobel Prize laureate
Richard Dawkins, zoologist, Oxford Univ.
L. Sprague de Camp, author, engineer
Cornelis de Jager, professor of astrophysics, Univ. of Utrecht, the Netherlands
Bernard Dixon, science writer, London, U.K.
Paul Edwards, philosopher, Editor, *Encyclopedia of Philosophy*
Kenneth Feder, professor of anthropology, Central Connecticut State Univ.
Antony Flew, philosopher, Reading Univ., U.K.
Andrew Fraknoi, astronomer, Foothill College, Los Altos Hills, Calif.
Kendrick Frazier,* science writer, Editor, SKEPTICAL INQUIRER
Yves Galifret, Exec. Secretary, l'Union Rationaliste
Martin Gardner,* author, critic
Murray Gell-Mann, professor of physics, Santa Fe Institute; Nobel Prize laureate
Thomas Gilovich, psychologist, Cornell Univ.
Henry Gordon, magician, columnist, Toronto
Stephen Jay Gould, Museum of Comparative Zoology, Harvard Univ.
C. E. M. Hansel, psychologist, Univ. of Wales
Al Hibbs, scientist, Jet Propulsion Laboratory
Douglas Hofstadter, professor of human understanding and cognitive science, Indiana Univ.
Gerald Holton, Mallinckrodt Professor of Physics and Professor of History of Science, Harvard Univ.
Ray Hyman,* psychologist, Univ. of Oregon
Leon Jaroff, sciences editor emeritus, *Time*
Sergei Kapitza, editor, Russian edition, *Scientific American*
Philip J. Klass,* aerospace writer, engineer
Edwin C. Krupp, astronomer, director, Griffith Observatory
Paul Kurtz,* chairman, CSICOP
Lawrence Kusche, science writer
Leon Lederman, emeritus director, Fermilab; Nobel laureate in physics
Elizabeth Loftus, professor of psychology, Univ. of Washington
Paul MacCready, scientist/engineer, AeroVironment, Inc., Monrovia, Calif.
John Maddox, editor emeritus of *Nature*
David Marks, psychologist, Middlesex Polytech, England
Walter C. McCrone, microscopist, McCrone Research Institute
Marvin Minsky, professor of Media Arts and Sciences, M.I.T.
David Morrison, space scientist, NASA Ames Research Center
Richard A. Muller, professor of physics, Univ. of Calif., Berkeley
H. Narasimhaiah, physicist, president, Bangalore Science Forum, India
Dorothy Nelkin, sociologist, New York Univ.
Joe Nickell,* senior research fellow, CSICOP
Lee Nisbet,* philosopher, Medaille College
James E. Oberg, science writer
Loren Pankratz, psychologist, Oregon Health Sciences Univ.
John Paulos, mathematician, Temple Univ.
Mark Plummer, lawyer, Australia
W. V. Quine, philosopher, Harvard Univ.
Milton Rosenberg, psychologist, Univ. of Chicago
Wallace Sampson, M.D., clinical professor of medicine, Stanford Univ.
Evry Schatzman, president, French Physics Association
Eugenie Scott,* physical anthropologist, executive director, National Center for Science Education
Glenn T. Seaborg, University Professor of Chemistry, Univ. of California, Berkeley; Nobel Prize laureate
Thomas A. Sebeok, anthropologist, linguist, Indiana Univ.
Robert Sheaffer, science writer
Elie A. Shneour, biochemist; author, director, Biosystems Research Institute, La Jolla, Calif.
Dick Smith, film producer, publisher, Terrey Hills, N.S.W., Australia
Robert Steiner, magician, author, El Cerrito, Calif.
Jill Cornell Tarter, SETI Institute
Carol Tavris, psychologist and author, Los Angeles, Calif.
Stephen Toulmin, professor of philosophy, Univ. of Southern California
Steven Weinberg, professor of physics and astronomy, Univ. of Texas at Austin; Nobel Prize laureate
Marvin Zelen, statistician, Harvard Univ.
Lin Zixin, former editor, *Science and Technology Daily* (China)

* Member, CSICOP Executive Council
(Affiliations given for identification only.)

• • • Visit the CSICOP web site at http://www.csicop.org • • •

The SKEPTICAL INQUIRER (ISSN 0194-6730) is published bimonthly by the Committee for the Scientific Investigation of Claims of the Paranormal, 3965 Rensch Rd., Amherst, NY 14228-2743. Printed in U.S.A. Second-class postage paid at Amherst, New York, and additional mailing offices. Subscription prices: one year (six issues), $32.50; two years, $54.00; three years, $75.00; single issue, $4.95.

Inquiries from the media and the public about the work of the Committee should be made to Paul Kurtz, Chairman, CSICOP, Box 703, Amherst, NY 14226-0703. Tel.: (716) 636-1425. FAX: 716-636-1733.

Manuscripts, letters, books for review, and editorial inquiries should be addressed to Kendrick Frazier, Editor, SKEPTICAL INQUIRER, 944 Deer Drive NE, Albuquerque NM 87122. FAX 505-828-2080. For Guide for Authors, see the January/February 1997 issue, page 65, or send a fax request to the Editor.

Articles, reports, reviews, and letters published in the SKEPTICAL INQUIRER represent the views and work of individual authors. Their publication does not necessarily constitute an endorsement by CSICOP or its members unless so stated.

Copyright ©1997 by the Committee for the Scientific Investigation of Claims of the Paranormal. All rights reserved.

The SKEPTICAL INQUIRER is available on 16mm microfilm, 35mm microfilm, and 105mm microfiche from University Microfilms International and is indexed in the Reader's Guide to Periodical Literature.

Subscriptions, change of address, and advertising should be addressed to: SKEPTICAL INQUIRER, Box 703, Amherst, NY 14226-0703. Or call toll-free 1-800-634-1610 (outside U.S. call 716-636-1425). Old address as well as new are necessary for change of subscriber's address, with six weeks advance notice. SKEPTICAL INQUIRER subscribers may not speak on behalf of CSICOP or the SKEPTICAL INQUIRER.

Postmaster: Send changes of address to SKEPTICAL INQUIRER, Box 703, Amherst, NY 14226-0703.

Skeptical Inquirer

September/October 1997 • VOL. 21, NO. 5

ALTERNATIVE MEDICINE IN A SCIENTIFIC WORLD

24 **Alternative Medicine and the Laws of Physics**

The mechanisms proposed to account for the alleged efficacy of such methods as touch therapy, psychic healing, and homeopathy involve serious misrepresentations of modern physics.

ROBERT L. PARK

29 **Why Bogus Therapies Seem to Work**

At least ten kinds of errors and biases can convince intelligent, honest people that cures have been achieved when they have not.

BARRY L. BEYERSTEIN

35 **Inconsistencies and Errors in Alternative Medicine Research**

Faulty research purporting to show the effectiveness of 'alternative' therapies is making its way into the literature, while studies showing negative results for these therapies go unpublished.

WALLACE SAMPSON

39 **Pseudoscience in Alternative Medicine**

Many alternative treatments are said to work because they are based on science, and consumers who are not scientifically literate believe this. A critical review of the publications of alternative medical proponents in three selected areas—chelation therapy, antineoplastons, and coffee enemas—quickly exposes the fiction.

SAUL GREEN

43 **Skewing the Scientific Worldview**

URSULA W. GOODENOUGH

44 **Taking a Bite out of Shark Cartilage**

A tremendous amount of marketing has accompanied the sale of shark cartilage as a preventive and cure for cancer. Do the claims far outstrip the evidence?

LYNN McCUTCHEON

ON THE COVER:
Illustration by Michael Boychuck

Alternative Medicine in a Scientific World, p. 24

COLUMNS

EDITOR'S NOTE 4

NEWS AND COMMENT
World Survives Roswell Hysteria / *Roswell Report Executive Summary* / *AIAA Honors Scientist* Who Says He Caused Roswell Incident / News Accounts of UFOs Affect Beliefs / Skeptical *Simpsons* Episode Spoofs Aliens, Pseudoscience / The Electronic Poltergeist / Religious Belief Among Scientists Stable for Eighty Years / Bending the Mind, Bending the Data? / The San Luis Valley Crystal Skull / 'Miracle' Priest Suspended 5

NOTES OF A FRINGE-WATCHER
The Numerology of Dr. Rashad Khalifa
MARTIN GARDNER 16

INVESTIGATIVE FILES
Extraterrestrial Iconography
JOE NICKELL 18

MEDIA WATCH
Dark Skies Uses Pseudo-Sagan to Recast Astronomer's Motives
C. EUGENE EMERY JR. 20

PSYCHIC VIBRATIONS
The Truth Is, They Never Were 'Saucers'
ROBERT SHEAFFER 22

CONFERENCE REPORT
Medical School Faith Healing: Report on a Spirituality Conference
BRYANT FURLOW 49

ANNOUNCEMENT
New Journal Defends Scientific Medicine 51

NEW BOOKS 56

ARTICLES OF NOTE 56

LETTERS TO THE EDITOR 60

BOOK REVIEWS

Hystories: Hysterical Epidemics and Modern Culture
by Elaine Showalter
TANER EDIS and AMY SUE BIX 52

In Search of the Light: The Adventures of a Parapsychologist
by Susan Blackmore
ROBERT A. BAKER 53

Scams from the Great Beyond: How to Make Easy Money off of ESP, Astrology, UFOs, Crop Circles, Cattle Mutilations, Alien Abductions, Atlantis, Channeling, and Other New Age Nonsense
by Peter Huston
DAVID BLOOMBERG 55

EDITOR'S NOTE

Alternative Medicine in a Scientific World

Alternative medicine, we are told, has newfound respectability. People flock to alternative medical practitioners. Books by them become bestsellers. Mainstream media report respectfully on the latest alternative treatments. The mind-body connection seemingly promises deep new healing capabilities. Sympathetic congressmen push the National Institutes of Health to establish an office of alternative medicine.

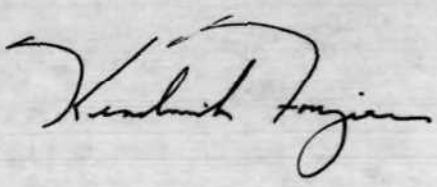
Alternative medicine's appeal is understandable. Scientific medicine has given the developed world the best medical treatment that history has ever seen. We have all benefited from it. But it can be highly technological, and many people yearn for something more personal. Physicians, once symbolized by the kindly small-town doctor who makes house calls and everyone knows, now often tend to be more-or-less faceless experts with whom we're lucky to get five minutes. Clinics teem with take-a-number patients and the buzz of modern health-care bureaucracy. Yes, the appeal of someone who takes time, listens, tells you you're going to get better, and provides you the nostrums to do so is understandable.

It is that very attractiveness, however, that can make patients so vulnerable. Few people have the time, means, or desire to sift through even the promotional literature, let alone the scientific literature, to sort out the exaggerated assertions, unproved cures, untested claims, the urgings of unscrupulous hucksters, and out-and-out quackery. Alternative medicine, despite its homespun image, is big business. Billions of dollars change hands. And, like traditional medicine, it aggressively promotes its wares. But with far less scientific evaluation.

We devote the articles in this issue to the topic of "Alternative Medicine in a Scientific World." The articles have their origin in a symposium by the same name at the 1997 annual meeting of the American Association for the Advancement of Science in Seattle. Symposium co-organizers Ursula Goodenough of the Department of Biology at Washington University, St. Louis, and Robert Park of the American Physical Society and the Department of Physics at the University of Maryland are represented here, as are three other symposium presenters. We've added one additional article that fits the general theme.

Sorting out the scientifically valid from the invalid and the reasonable from the unreasonable is difficult in the area of alternative medicine (partly because practitioners and writers co-opt some of the language of science and apply it in unfamiliar, if not misleading, ways). I think our articles are a step in that direction. They examine particular topics—homeopathy, (no)touch therapy, psychic healing, chelation therapy, antineoplastons, detoxification with coffee enemas, acupuncture for drug withdrawal, and unproven cancer cures, for example—and explore important general themes, such as our own judgmental biases, why bogus therapies seem to work, and the ways in which many claims misrepresent modern physics.

Alternative medicine can usefully and benignly complement scientific medicine, or it can seriously mislead patients and distract them from proven treatments. We hope the information and perspectives provided in this issue can help you better make your own reasoned judgments.



Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

EDITOR
Kendrick Frazier

EDITORIAL BOARD
James E. Alcock
Barry Beyerstein
Martin Gardner
Ray Hyman
Lawrence Jones
Philip J. Klass
Paul Kurtz
Joe Nickell
Lee Nisbet
Amardeo Sarma
Béla Scheiber
Eugenie Scott

CONSULTING EDITORS
Robert A. Baker
John R. Cole
Kenneth L. Feder
C. E. M. Hansel
E. C. Krupp
David F. Marks
Andrew Neher
James E. Oberg
Robert Sheaffer
Steven N. Shore

MANAGING EDITOR
Gwen A. Burda

ART DIRECTOR
Chris Kuzniarek

PRODUCTION
Paul Loynes

CARTOONIST
Rob Pudim

WEB PAGE DESIGNER
Patrick Fitzgerald

PUBLISHER'S REPRESENTATIVE
Barry Karr

CORPORATE COUNSEL
Brenton N. VerPloeg

ASSISTANT BUSINESS MANAGER
Sandra Lesniak

CHIEF DEVELOPMENT OFFICER
James Kimberly

ASSOCIATE DIRECTOR OF DEVELOPMENT
Anthony C. Battaglia

CHIEF DATA OFFICER
Richard Seymour

FULFILLMENT MANAGER
Michael Cione

STAFF
Elizabeth Begley
Allison Cossitt
Kevin Dean
Amy Goble
Linda Heller
Matthew Nisbet
Paul Paulin
Diana Picciano
Alfreda Pidgeon
Etienne Ríos
Ranjit Sandhu
Sharon Sikora
Vance Vigrass
Dana Walpole

INQUIRY MEDIA PRODUCTIONS
Thomas Flynn

DIRECTOR OF LIBRARIES
Timothy S. Binga

The SKEPTICAL INQUIRER is the official journal of the Committee for the Scientific Investigation of Claims of the Paranormal, an international organization.

World Survives Roswell Hysteria, Aliens Remain Elusive

The world has apparently survived the latest round of alien hysteria.

Roswell, New Mexico's, internationally publicized weeklong UFO festival, July 1–6, commemorating an alleged crash of an extraterrestrial spacecraft in 1947, has come and gone, leaving not much in its wake except happy and exhausted believers, improved balance sheets for the town's business facilities (an estimated 40,000 people attended), an enormous expenditure of newsprint and national and international TV and radio time, and, if anything, further diminished scientific literacy and even less credibility for the UFO movement.

It could all be chalked up to a whole lot of summer silliness if so many people didn't take it all so seriously. The accepted storyline, long impervious to facts and reason, was recounted endlessly, and the government in general and the Air Force in particular were lambasted with little let up.

The whole thing was preceded by cover articles in at least three national magazines and so much other prominent national publicity that the delighted Roswellian business leaders were tabulating its value to them in the millions.

Then the Air Force itself got into the act, issuing its second report in three years on the Roswell incident, *The Roswell Report: Case Closed*. The Air Force put on a full-bore news conference in Washington, which initially did little more than pour more fuel on the fire, bringing guffaws from much of the media and believers alike who couldn't believe people could confuse drop-test dummies of the 1950s with aliens in the late 1940s.

Little mentioned at the time was that reports of alien bodies associated with the 1947 Roswell incident didn't emerge until the late 1970s, nearly three decades after the supposed original event, when a new generation of pro-UFO writers began writing books on the subject. One of the big issues here is the unreliability of eyewitness testimony as a guide to truth in the absence of corroborating physical evidence. A related issue, as psychologists and social scientists would point out, is not just the imperfection of memories—and our ability to commingle widely different events into one seemingly sensible story—but the exuberant *creativity* of memory, not to mention the swirling social dynamics that lead to commonly accepted folk stories.

Eventually some people actually began reading the new Air Force report and realized it might have some useful points to make. It contained affidavits from participants in Air Force crash-test and scientific ballooning experiments in the 1950s describing actual events that bore an uncanny likeness to some of the reported recollections of Roswell "witnesses."

"I've now read the Air Force report," said prominent UFO investigator Karl T. Pflock, author of *Roswell in Perspective* (Fund for UFO Research, 1994) in a June 28 e-mail message to me and others. He retracted his initial negative portrayal of the report, made, he said, on the basis of news accounts only: "Don't believe the comments you read by a guy named Pflock who opened his mouth before reading," said Pflock. "If you've read the report, I'm sure you'll agree it's actually very good and very on-target."

The report is a follow-up to the 1994 Air Force report (excerpted in *SI*, January/February 1995) that had confirmed the almost certain origin of the original Roswell debris as New York University/Project Mogul scientific balloon experiment launches from Alamogordo in June 1947—specifically Flight 4, launched June 4, 1947, with instruments and three odd-shaped radar reflectors carried aloft by a vertical assemblage of some twenty-three five-foot-diameter neoprene balloons, tracked to the northeast to within seventeen miles of the famous Brazel/Foster ranch site, and never recovered—by the experimenters anyway. The project engineer for those balloon launches at the time, New Mexico Tech professor emeritus of physics Charles B. Moore, subsequently provided eight lines of physical evidence supporting that same conclusion (*SI*, July/August 1995).

Popular Science
THE F-22 Quicker, Stealthier, Deadlier
Electronic SHARK Repellent
7 HOTTEST SPORTS CARS
UFO Mania at ROSWELL
What really crashed in New Mexico 50 years ago?
Tens of thousands of UFO believers and debunkers will make a pilgrimage to sort out fact from fiction.
RAAF Captures Flying Saucer On Ranch in Roswell Region

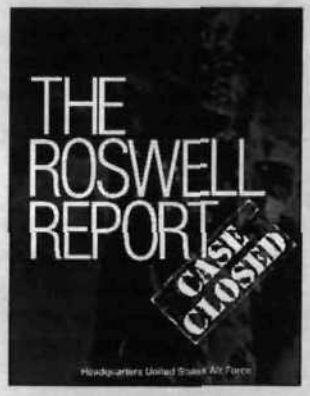
The second Air Force report was an attempt to respond to criticisms that the 1994 report, while perhaps explaining and dispelling the original crashed-saucer announcement of July 7, 1947, had ignored the issue of "alien bodies."

To many, the Air Force explanation of drop-test dummies, other aeromedical projects, and actual crashes and accidents in the 1950s in the Roswell area seemed like a stretch, and this prompted even more assertions that the government was lying and covering up. Indeed, a single news report, quoting the Roswellian faithful, could and did assert that the government could not be trusted while simultaneously calling on the government to again report what it knew—as though they *would* believe the *next* report. One could be forgiven the sneaking suspicion that the only official report about Roswell that would be accepted would be an announcement that it was all true—crashed saucers, alien bodies, the whole smear. Would that then be called a lie and coverup too? Hard to know.

In the meantime, some news organizations did responsible reports (see Articles of Note, this issue, for descriptions of several), although it was almost impossible to keep up with the number of TV specials and news segments, some balanced (e.g., ABC's *Nightline* of July 3), some appalling in their exploitiveness.

Many of the more judicious reports—some quoting the new Smithsonian book by Brandeis University anthropologists Benson Saler and Charles A. Ziegler and the aforementioned Project Mogul atmospheric scientist Charles B. Moore—covered the matter as a modern myth, a now solidly entrenched belief system that provides

Roswell Report: Case Closed Executive Summary



The following is the executive summary of the new Air Force report Roswell Report: Case Closed *(ISBN 0-16-049018-9, U.S. Government Printing Office stock number 008-070-00719-3, 250 pp., $18, phone orders 202-512-1800):*

In July 1994, the Office of the Secretary of the Air Force concluded an exhaustive search for records in response to a General Accounting Office (GAO) inquiry of an event popularly known as the "Roswell Incident." The focus of the GAO probe, initiated at the request of a member of Congress, was to determine if the U.S. Air Force, or any other U.S. government agency, possessed information on the alleged crash and recovery of an extraterrestrial vehicle and its alien occupants near Roswell, N.M., in July 1947.

The 1994 Air Force report concluded that the predecessor to the U.S. Air Force, the U.S. Army Air Forces, recovered debris from an Army Air Forces balloon-borne research project code named MOGUL. Records located describing research carried out under the MOGUL project, most of which were never classified (and publicly available), were collected, provided to GAO, and published in one volume for ease of access for the general public.

This report discusses the results of this exhaustive research and identifies the likely sources of the claims of "alien bodies" at Roswell. Contrary to allegations, many of the accounts appear to be descriptions of unclassified and widely publicized Air Force scientific achievements. Other descriptions of "bodies" appear to be actual incidents in which Air Force members were killed or injured in the line of duty.

The conclusions are:

- Air Force activities which occurred over a period of many years have been consolidated and are now represented to have occurred in two or three days in July 1947.
- "Aliens" observed in the New Mexico desert were probably anthropomorphic test dummies that were carried aloft by U.S. Air Force high altitude balloons for scientific research.
- The "unusual" military activities in the New Mexico desert were high-altitude research balloon launch and recovery operations.
- Reports of military units that always seemed to arrive shortly after the crash of a flying saucer to retrieve the saucer and "crew" were actually accurate descriptions of Air Force personnel engaged in anthropomorphic dummy recovery operations.
- Claims of "alien bodies" at the Roswell Army Air Field hospital were most likely a combination of two separate incidents:

1) a 1956 KC-97 aircraft accident in which 11 Air Force members lost their lives; and,
2) a 1959 manned balloon mishap in which two Air Force pilots were injured.

An anthropomorphic dummy of the type used in 1950s Air Force high altitude aircraft escape projects. (U.S. Air Force photo)

This report is based on thoroughly documented research supported by official records, technical reports, film footage, photographs, and interviews with individuals who were involved in these events.

some psychological meaning and support to the believers, much as do mainstream religious beliefs, and with all the same resiliency and resistance to reason and contradictory fact.

By wonderful irony, the Roswell festivities were finally knocked off the front pages on the Fourth of July by real science and a real event involving aliens. Only this time the aliens were us, as represented by the successful landing of the Pathfinder spacecraft and its little Sojourner roving robot, and the planet landed on was Mars. Millions here on Earth were treated to real scientists reacting with unabashed joy and delight at real close-up scenes of the surface of Mars. It had a cleansing effect for the heart and the mind.

The executive summary of the new Air Force report *Roswell Report: Case Closed* is reproduced here. The SKEPTICAL INQUIRER will report on it and related matters in more detail in future issues.

—Kendrick Frazier, Editor

AIAA Honors Scientist Who Says He Caused Roswell Incident

A New Mexico scientist who says his research caused the infamous Roswell UFO incident was honored June 4—fifty years to the day after he launched the experimental balloon that set off decades of alien assumptions.

Socorro physicist Charles B. Moore received the Otto C. Winzen Lifetime Achievement Award at the American Institute of Aeronautics and Astronautics conference in San Francisco.

Moore sees a "poetic justice" in the anniversary of his balloon launch coinciding with the award.

"You can't escape your past," the seventy-six-year-old said, laughing.

Moore is professor emeritus at the New Mexico Institute of Mining and Technology and chairman of the Langmuir (Lightning) Laboratory, west of Socorro, New Mexico.

Atmospheric physicist Charles B. Moore demonstrates an odd-shaped Signal Corps radar reflector like those used in his 1947 experiments. His Flight 4, launched June 4, 1947, from Alamogordo, New Mexico, and not recovered, used twenty-three balloons to carry aloft instrumentation and three such radar reflectors. The debris is thought to have been the stimulus for the "Roswell incident." (Photo by David E. Thomas)

His resume includes a number of major accomplishments and discoveries, including documenting how cloud seeding works.

But he doesn't mind a touch of fame for perhaps the biggest alien tale ever—the purported crash of an alien spacecraft on a ranch near Roswell.

"It's a glorious myth . . . that people have told and enhanced," he said. "But it doesn't have much to do with reality." And it certainly does not have much to do with science, says Moore, who was honored for an array of scientific achievements, including advances in scientific ballooning and the discovery of vapor in the atmosphere of Venus.

Moore served this summer as the scientific consultant to the New Mexico Weather Control and Cloud Modification Commission. In May, it granted the first application in thirty years for cloud seeding this summer in eastern New Mexico.

Moore and atmospheric scientist Bernard Vonnegut conducted the first scientific tests of cloud seeding more than four decades ago near Socorro.

His verdict: It's great for generating ice crystals in clouds but locks up moisture in clouds, which reduces rainfall on the ground.

The Roswell incident has prompted five decades of speculation about a government conspiracy and coverup of an alien intrusion. Recent variations included the secret alien autopsy and the existence of a recovered Roswell UFO spacecraft at a secret base in Nevada.

The incident, which has many fans and serious advocates, was celebrated this summer in Roswell. But Moore and Air Force investigators say it's all bunk.

An Air Force investigation of its own classified records concluded in a 1994 report that the Roswell crash debris was the remains of a balloon launched as part of the secret Air Force Project Mogul. As a twenty-six-year-old graduate student from New York University, Moore conducted the experiments.

He invented a new type of high-altitude balloon that was repeatedly tested to determine if it could be used as a sky spy [*SI*, July/August 1995; January/February 1995]. The balloons were equipped to listen for sound reverberations in the atmosphere that would indicate the Soviet Union had conducted a nuclear-weapon test.

Two years ago in an interview with the *Albuquerque Tribune*, Moore said he had conducted his own investigation and was certain that the "alien" remains found near Roswell were all that was left of Mogul balloon Flight 4.

Taken by winds, it was the only balloon, in a series launched from Alamogordo, that was not recovered.

—Lawrence Spohn

Larry Spohn is the science reporter for the Albuquerque Tribune, *where this article originally appeared. Reprinted by permission.*

News Accounts of UFOs Affect Beliefs, Purdue Researcher Glenn Sparks Finds

With the lines between television news and entertainment blurring, people's beliefs in unidentified flying objects of extraterrestrial origin can easily be swayed by what they see on TV, says Purdue University researcher Glenn Sparks.

"The credibility of the source is important when it comes to how people evaluate the information they hear," says Sparks, a professor of communication. "Our research shows that when uncritical accounts of UFO sightings are aired in the news, belief in UFOs increases among the audience."

Sparks tested the phenomenon by showing study participants two segments from a CBS *48 Hours* program hosted by anchor Dan Rather. The entire show was on the topic of UFOs and first aired on April 20, 1994. Participants' beliefs in UFOs were measured both before and after viewing the segments.

Half the participants saw a segment with a one-sided story featuring people who allegedly witnessed space aliens being dragged from a flying-saucer crash in New Mexico in 1947. The segment appeared exactly as it was originally broadcast and contained nothing that would discredit the existence of flying saucers.

The rest of the participants were shown a segment that depicted a group "filming an actual UFO." As part of the piece, scientists commented on the film and used computer enhancement to show that the image probably was nothing more than a conventional jet aircraft.

The one-sided segment increased UFO beliefs almost as much as the two-sided segment decreased beliefs, Sparks says. The two-sided-message group dropped more than 3.5 points on the UFO beliefs measure, while the one-sided group increased their UFO beliefs by nearly 2.5 points. "Statistical analysis revealed that the probability that changes of this magnitude would occur by chance alone is less than 3 in 10,000," he says.

Spark says the effect of news stories about UFOs is particularly important given the number of people who are uncertain about their beliefs. "Surveys show that one-third to one-half of adults belief in the existence of UFOs," he says. "Another third are uncertain about their existence and are therefore likely to be impacted by information from sources they perceive to be credible.

"Overall, that particular episode of *48 Hours* did present a balanced treatment of UFOs. However, many viewers see only portions of a program, and those segments that are not balanced may be accepted by audience members without any critical scrutiny.

"The burden is on broadcasters of high-credibility programs to present balanced, thorough accounts of the phenomenon being addressed."

The upswing in interest in paranormal events has spawned many television entertainment programs such as *Unsolved Mysteries*, *The X-Files*, and *Sightings*. Sparks says the impact of these shows on paranormal beliefs should not be as great as that of respected news shows.

"People expect to believe the information they get from sources like *48 Hours* and Dan Rather. These expectations bias the way they process information while viewing the show and hinder critical scrutiny," Sparks says.

Sparks's study tied for the "Top Paper" award in the research division from the Broadcast Education Association during its annual convention April 4–7 in Las Vegas, Nevada.

—*Purdue University News Service*

The SKEPTICAL INQUIRER expects to publish in the near future an article by Sparks on these and other aspects of his research on how news accounts affect beliefs.

Skeptical *Simpsons* Episode Spoofs Aliens, Pseudoscience

It's rare that a popular, prime-time network television show turns out to be a "slam dunk" for skeptics.

But it happened this spring on Fox, the network of *The X-Files*.

The Simpsons, Fox's long-time animated hit series, has a reputation for being smart, innovative, well-written, and very funny. After the final new episode of the season aired Sunday, May 18, the network re-ran *The Simpsons*' "alien encounter" show, first broadcast earlier in the year.

Rarely has any half-hour of television been so thoroughly enjoyable for skeptical viewers. Granted, it's only a half-hour, but *The Simpsons* is re-run continuously on Fox outlets nationwide, so viewers haven't seen the last of this outstanding episode.

Right from the beginning, it's obvious this isn't going to be the typical television fare.

An animated Leonard Nimoy sits at a table that sports a skull and flickering candles. Books line shelves behind him as he introduces the "documentary" we are about to view.

It really is Nimoy's voice. As host of the notorious, syndicated *In Search Of* series, Nimoy is considerably more familiar to most viewers than is Occam's Razor.

Not tonight, Spock. "The following story of an alien encounter is true," he says. "And by 'true' I mean it's false. It's all a bunch of lies. (Pause) But they're such *entertaining* lies."

Cut to Homer Simpson, hapless and corpulent employee of the Springfield Nuclear Power Plant, slamming down Duff beers on Friday night at Moe's, his favorite tavern.

Being a responsible bartender, Moe makes Homer take a Breathalyzer test before allowing him to leave at 1 A.M. Homer's breath sends the machine to its highest level ("Boris Yeltsin") and Moe makes his patron walk home.

Homer has an encounter with an alien, and *X-Files* FBI agents Mulder and Scully come to investigate in *The Simpsons* episode "The Springfield Files," on FOX. *The Simpsons* ™ and ©1996 20th Century Fox Film Corp. All rights reserved.

As Homer cuts through some eerie woods, the mood is heightened by the piercing strings of the *Psycho* movie theme. Turns out only to be the Springfield Philharmonic Orchestra tuning up as its members return home via a city bus.

But, sure enough, soon a green, glowing, classic "alien"—small, hairless, big head, big eyes—sweeps toward Homer through the trees. Homer flees in terror, tracing what looks to be a crop-circle "Yaaaah" in his wake.

Back home, he awakens his wife, Marge, who asks if Homer had been drinking. "No! Well, ten beers," he replies.

At breakfast the next morning, Homer is confronted by his brainy daughter, Lisa, who is reading *Junior Skeptic* magazine, surely a television first.

Lisa informs Homer the odds against actually contacting an extraterrestrial life form are 175 million to one. "The people who claim they see aliens are always pathetic low-lifes with boring jobs," she says. "Oh, and you, Dad."

At work, Homer relates his experience to fellow employees. "Then they put me on a cold, metal table and prodded me with humiliating probes. No, wait, that was my physical."

The scene shifts, and suddenly *The Simpsons* has turned into *The X-Files*, complete with theme and an animated Scully and Mulder, with the actual voices of *X-Files* leads Gillian Anderson and David Duchovny.

We're at FBI headquarters, and the pair has heard about Homer. "Another unsubstantiated UFO sighting in the heartland of America," Mulder says. "We've got to get there right away."

Scully says she has information that a shipment of drugs and illegal weapons is coming into New Jersey that night. "I hardly think the FBI is concerned with a matter like that," Mulder scoffs.

Their interview with Homer is less than successful. His first stupid answer blows up their lie detector. When they return to Moe's to re-create the night, Homer gets drunk, says he was discussing philosophy before the alien encounter, makes a pass at Scully, and falls off his barstool.

They return to the woods at dark. No alien, so Mulder takes advantage of the situation to make a pompous speech asking if we are alone in the universe and wondering about "the unsolved mysteries of *Unsolved Mysteries*."

The effect is dramatic with the darkening sky and a flashing meteor behind Mulder. Unfortunately for the effect, also behind Mulder are bartender Moe and two coworkers carrying Shamu, the killer whale.

Moe thinks the FBI is after him for kidnapping the mighty mammal from Sea World to use for some unspecified purpose in his tavern. "Who would have thought a whale would be so heavy?" he asks, rhetorically.

Ridiculed by his neighbors, Homer retreats to his own kitchen where he has a touching encounter with his ne'er-do-well son Bart. The Simpson "men" decide they'll camp out in the woods and look for the alien the following night, which happens to be the next Friday.

And the alien appears again, just as before, saying, "I bring you peace." Homer tries to approach the ET but sets his foot ablaze in the campfire.

No problem. Bart has the alien's appearance on videotape. It's shown the next day on television news, so of course it is accepted as real and most of Springfield shows up at Homer's house to voice support and ask penetrating questions like, "Is the alien Santa Claus?"

Back to Nimoy, who ends the documentary. "From this simple man came proof that we are not alone in the universe," is his benediction.

Unfortunately for Nimoy, and the "proof," only twenty minutes have elapsed in the thirty-minute show, a fact he is made aware of by a stagehand. "I've, uh, got to get something out of my car," Nimoy says. The next sound we hear is him driving away.

The "real" ending is yet to come. The next Friday there is a carnival atmosphere in the Springfield woods, complete with T-shirt vendors, food booths, and a band playing the five-note *Close Encounters of the Third Kind* anthem. Even Nimoy shows up.

The alien appears, bestowing love upon the crowd. "It's bringing love. . . . Break its legs," is the mob's reaction.

But Lisa Simpson spoils all the fun. She steps in and shines her flashlight on the alien, which turns out to be just old Montgomery Burns, owner of the Springfield Nuclear Power Plant.

Burns's toady assistant, Smithers, explains that every Friday night the wealthy megalomaniac undergoes a series of treatments "designed to cheat death for another week."

After an assembly line of chiropractic work, pain-killing shots, and eyedrops, Burns, the opposite of his misanthropic self for a few hours, usually wanders off through the woods. "It leaves me twisted and disoriented," Burns explains. "It also leaves me as impotent as a Nevada boxing commissioner."

Fund for the Future

CSICOP AT THE CENTER FOR INQUIRY

An Unprecedented $20 Million Drive for the

Human beings have never understood the material universe as thoroughly as they do today. Yet never has popular hunger for superstition, pseudoscience, and the paranormal been so acute.

CSICOP and the *Skeptical Inquirer* are leading advocates for skepticism nationally and worldwide. But so much more must be done in the years to come.

Day and night, the Center for Inquiry has become a focus of academic and popular inquiry.

Publishing revenues alone cannot fund the bold outreach today's challenges demand. Hence the Fund for the Future Campaign, a ten-year effort to add 20 million dollars to the Center for Inquiry endowments.* Gifts and endowment income will fund projects including:

Council for Media Integrity

Formed just weeks after its inclusion in the Ten-Year Plan, the Council for Media Integrity will monitor and rebut media programs that convey unfounded claims and mislead the public about science. Members include Steve Allen (chair), Carl Sagan, Stephen Jay Gould, and many others. CSICOP will invest in electronic infrastructure to facilitate rapid response to irresponsible programs.

Adult Education

The Council cosponsors the Center for Inquiry Institute, which has already expanded its offerings to include a new three-year certificate program in science and skepticism. Sessions are scheduled in Amherst and Los Angeles.

Enhancing Library Resources

The Center for Inquiry's skeptics' library—already the finest of its kind in the world—needs expanded funding to enlarge its core collection and add electronic media. Worldwide modem access to the library's catalog is already nearly complete.

*Combined endowment goal of CSICOP and the Council for Secular Humanism, both nonprofit tax-exempt educational organizations.

Steve Allen
Honorary Co-chair

Martin Gardner
Honorary Co-chair

uture of Science and Reason

The New Ten-Year Plan

To continue its leadership in the defense of reason, CSICOP has articulated a Ten-Year Plan designed to:

- *Promote science and reason*
- *Develop public support and participation*
- *Develop The Center for Inquiry as an education and research center*
- *Build up the Committee's resources*

The Center for Inquiry attracts global media attention with scholarly conferences and events like this public "Friday the 13th Superstition Bash."

For the Young

To present skeptics' message more compellingly to the young, CSICOP will develop new materials—ranging from age-appropriate print publications to audio and video cassettes and instructional courseware. Goals include enhanced understanding of science and improved critical thinking skills.

Regional Outreach

With the establishment of The Center for Inquiry - West (Los Angeles), The Center for Inquiry - Midwest (Kansas City) and The Center for Inquiry - Rockies (Boulder, Colorado), giant steps have been taken to enhance direct field service to skeptical activists. Additional regional Centers are planned with expanded calendars of activities.

How Can I Help?

The Center for Inquiry Fund for the Future depends on generous support from each of our readers and friends. Gifts of cash, securities, and other assets are sought. A three-year pledge can make more substantial gifts surprisingly affordable. Many forms of planned giving arrangements can be arranged. All requests will be held in confidence.

Only financial support from skeptics and other friends of science can place the skeptical movement on a firm financial foundation.

At the first World Skeptics Congress in Amherst, New York, participants gave or pledged an unprecedented $201,000 to give the Fund for the Future campaign a vigorous start.

We invite you to make your commitment to the Fund for the Future today. For more information, complete and mail the postpaid reply card.

CSICOP
at the
Center for Inquiry
P.O. Box 703
Amherst, NY 14226-0703

(716) 636-1425
FAX (716) 636-1733

What about the glowing? "A lifetime of working at a nuclear power plant has left me with a healthy green glow," he says.

But the shots are wearing off and Burns is returning to "normal," vowing to make life miserable for Springfield until a physician jabs another needle into his arm, causing Burns to begin singing "Good Morning Starshine" from the musical *Hair*.

Nimoy steps up, puts his arm around Burns, joins in, and the show closes with the crowd, now including Scully and Mulder, finishing the song. There's a brief cut back to the absent Nimoy's set where the stagehand wraps up the "documentary."

It would be difficult to find another half-hour on network television in the past decade where any branch of pseudoscience was so thoroughly, and effectively, trashed.

Series creator Matt Groening and his staff of animators deserve some real appreciation from skeptics for this one. Next time some alien encounter is presented as fact I'd imagine at least a few viewers are going to remember old Monty Burns and start laughing.

But were *The Simpsons'* creators just being funny? I suspect the late-night kitchen encounter between Homer and Bart provides a clue.

Homer is agonizing over whether he and Bart should return to the woods to try to film the alien. He wonders if it's "the real thing."

"If it isn't, we can fake it and sell it to the Fox network. They'll buy anything," Bart replies.

"Now son," Homer admonishes. "They do a lot of quality programming."

Father and son look at each other and think about that one. Then both burst out laughing for a full five seconds.

The joke is, this time, Fox did exactly that.

—*Mike Brown*

Mike Brown is news editor for the Rockdale Reporter, *a community newspaper fifty miles from Austin, Texas.*

The Electronic Poltergeist

A strange entity, calling himself Sommy, harassed an Emeryville, Ontario, family for months, supposedly using "high-tech" means to stalk Debbie and Dwayne Tamais and make their lives miserable.

As reported on *Dateline NBC*, the harassment began with the telephone—at first clicks, as though someone was on the other extension, then disconnected calls whenever they attempted to phone out. Things got worse when the couple went on a vacation, leaving their fifteen-year-old son Billy in the care of a housesitter and friend, Cheryl McCaulis. Now the power went on and off, although the power company could find nothing amiss. Then the PIN (personal identification number) for accessing the voice mail was changed, although Bell Canada officials declared that impossible.

As the disturbances increased, Cheryl began keeping a log, even recording some of the noises made by Sommy. He made obscene and threatening calls, claiming he was watching the house. On other occasions he would just cut in on the line and make burping or grunting noises. By week's end he had cut the telephone lines. When Mr. and Mrs. Tamais returned from vacation, they had trouble believing their friend. Soon, however, Debbie Tamais herself talked to Sommy.

"It was freaky," she said, "the first time I heard him. I'll never forget him. My hair stood on ends. My arm was goose bumps. It was just the meanest voice." When she asked him why he was doing this, Sommy replied, "I just want a friend."

He reportedly learned to control the TV set and used the Tamais's telephone number to call others and harass them. He changed the ringing device on the Tamais's phone so it sounded strange. Worse, he even devised a way to eavesdrop on the family, telling them things that they insisted he could have learned only by monitoring their every word—information from details about Debbie's birthday to the Tamais's bank card PIN.

According to *Dateline*: "So far no one, not the police, not the utility companies, not private surveillance teams, or even a former member of the Canadian Mounties, has been able to find this not-so-friendly ghost. Though not for the lack of trying. The Tamais believe Sommy got into their house while it was under construction . . . and planted devices they've ripped out walls trying to find. Or they think he could have tapped into a line down the street with so many wires above ground in this still unfinished subdivision. In fact, experts tell us with all the digital and computer technology these days, it is theoretically possible." *Dateline* teamed up with the Discovery Channel to hire a private security firm to take, as reporter Chris Hansen put it, "our own shot at ghostbusting." But after more than six hours the team was forced to announce they had discovered nothing.

Unfortunately, *Dateline* failed to enlist the real ghostbusters. Some of us at the headquarters for the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP), and no doubt elsewhere, formed a hypothesis as soon as we saw the program. We realized that many of the phenomena described, such as the eavesdropping, could have been accomplished more easily by someone in the house, negating such an elaborate hypothesis as that involving highly sophisticated electronic wizardry. We also knew that such mischief is typically due to a disturbed youngster in the household (see Nickell, *Entities*, Prometheus Books, 1995). To catch a culprit, investigators have used a variety of techniques, ranging from use of dye powder (which stains the hands of a person touching a treated object) to hidden cameras. (One revealing film sequence, featured on Arthur C. Clarke's *Mysterious World* series, portrayed a little girl, caught *flagrante delicto*, smashing an object.)

Following the Friday night broad-

cast, however, before CSICOP could reply to urgings from our readers on the Internet, there came new developments. On Saturday, when the Tamais planned to take their son to the Ontario Provincial Police (OPP) station to defend him against rumors claiming he was guilty of the harassment, he instead confessed. An OPP spokesperson reported the next day that nothing would be gained by prosecuting the youth for what was "an internal family matter." The Tamais explained: "It started off as a joke with his friends and just got so out of hand that he didn't know how to stop it and was afraid to come forward and tell us in fear of us disowning him." They went on to "apologize" to the world for any pain or harm that was caused and added that they would seek professional counseling for the boy ("Teen-Age Son Confesses to Electronically Harassing His Family," *Buffalo News*, April 21, 1997).

—Joe Nickell

Joe Nickell is senior research fellow for CSICOP, author of numerous books investigating paranormal mysteries, and SI's "Investigative Files" columnist.

Religious Belief Among Scientists Stable for Eighty Years

According to a recent survey, 40 percent of U.S. scientists say they believe in God. The results, detailed in the April 3, 1997, edition of the journal *Nature*, surprisingly parallel the findings of a similar survey conducted over eighty years ago.

In 1916, researcher James Leuba polled one thousand biologists, mathematicians, astronomers, and physicists about their religious beliefs. Much to the astonishment of his contemporaries, Leuba found that 60 percent of scientists did not believe in God, and he predicted that with the spread of education, religion would increasingly be rejected.

To test this prediction, University of Georgia science historian Edward J. Larson and *Washington Times* reporter Larry Witham replicated the 1916 study. Like Leuba, they randomly polled one thousand biologists, mathematicians, astronomers, and physicists picked from the current edition of *American Men and Women of Science*. And they maintained Leuba's distribution of half biologists, one quarter mathematicians, and one quarter physicists or astronomers.

Although Larson and Witham found that the overall proportion of believers and disbelievers had remained virtually unchanged for nearly a century (though belief in human immortality declined 12.6 points to 38 percent), there were some significant shifts in the distribution of views among the disciplines. In 1916, biologists showed the highest rates of disbelief or doubt (69.5 percent). Today, physicists and astronomers hold that distinction (77.9 percent), while mathematicians are most inclined to believe in God (44.6 percent).

But the study is not without its limitations, as Larson and Witham readily admit. The actual number of scientists polled in the 1996 study only represents 3 percent of the biological and physical scientists and mathematicians listed in the 1995 *American Men and Women of Science*, whereas Leuba reached more than 20 percent of these groups. The 1996 study is thus open to randomization errors in ways that Leuba's was not. Witham has stated that names were drawn from the directory on an *n*th name basis, a relatively unsophisticated method.

Changing theological definitions might have affected the results as well. Larson and Witham point out that, based on previous surveys, roughly a quarter of Americans will define God as something other than the traditional deity. Since Larson and Witham's questions were narrowly defined, the overall results may be misleading. But Larson and Witham defend their study explaining that: "We believe that because . . . traditional (religious) tenants still prevail in American culture, retaining Leuba's 1916 definition of a God—hearing prayers and giving immortality—still gives the best simple question." They also add that their results corroborate a 1969 survey conducted by the Carnegie Commission that found 34 percent of physical scientists were "religiously conservative" and 43 percent of all physical and life scientists attended church two or three times a month.

Interestingly, Larson and Witham speculate that their findings may have some hidden benefits for scientists. "Nowadays, the U.S. scientific enterprise is fixated on the battle for federal funding. . . . If more than one-third of scientists hold beliefs dear to many conservative Americans, the knowledge that scientists are 'just like us' may evoke in them a sympathetic response."

—Thomas C. Genoni Jr.

Tom Genoni is CSICOP's West Coast Bureau Chief.

Bending the Mind, Bending the Data?

It's ironic when a pioneer in mind/body medicine acknowledges that the field of alternative therapies suffers from a lapse of scientific standards, and then allegedly proceeds to misrepresent scientific studies, including some of his own research.

But that is what biologist Irwin Tessman of Purdue University and physicist Jack Tessman of Tufts University say they found when they looked into some of the claims of Herbert Benson, founder of Harvard's Mind/Body Institute at Deaconess Hospital, whose latest book, *Timeless Healing: The Power and Biology of Belief*, asserts that humans are genetically "wired for God."

In the book, Benson cites a study in which "women who endured persistent nausea and vomiting during pregnancy

were given a drug they were told would cure the problem [while] in fact they were given the opposite—syrup of ipecac [which induces vomiting]—[and] remarkably, the patients' nausea and vomiting ceased entirely because they *believed* they received anti-nausea medicine."

The Tessman brothers, in a review of *Timeless Healing* in the April 18, 1997, issue of *Science* (276: 369–70), say the study was cited to show the power of the placebo effect. But according to their review, when they checked the original paper, they discovered that it involved only one pregnant woman.

Citing another study, one that he coauthored, Benson explains how "thirty-six percent of women with unexplained infertility became pregnant within six months" of completing a program that taught infertile women to relax through meditation.

But when the Tessmans checked the original study, they say they discovered that there were no matched controls, as the study's authors had properly pointed out, and "several" women became pregnant after they had been accepted into the program but before they had been taught meditative relaxation. "Assuming that 'several' means at least three," the brothers say in their review, "we calculate that (with a large statistical error) the conception rate before treatment began was at least equal to and possibly higher than the rate after treatment began."

Benson cites another study, of which he was also a coauthor, that supposedly found that "[p]atients who had open-heart surgery had fewer postoperative arrhythmias and less anxiety following surgery" if they had been taught relaxation techniques. Once again, the original research "demonstrated no significant evidence of benefits," the Tessmans conclude in their *Science* review.

One of the best-known claims surrounding the mind/body debate involves the ability of Tibetan monks to wrap themselves in wet, frigid, cotton sheets without shivering violently, as most people would do, according to Benson.

It turns out that Irwin Tessman tried the experiment using swimming trunks and a white cotton tennis shirt soaked with 9°C water. "The immediate effect was mildly bracing, but not truly uncomfortable (try it in still air, as the monks reportedly did). For the abbreviated 15-minute duration of a first-time trial, this aged beginner experienced no violent shivering or even serious discomfort," according to the review. "None of this would surprise wacky Green Bay Packers fans cavorting bare-chested in wintry Lambeau Field."

"People forget," said Irwin in an interview, "that the wet shirt actually insulates you."

— *C. Eugene Emery Jr.*

Gene Emery writes the SKEPTICAL INQUIRER*'s "Media Watch" column.*

The San Luis Valley Crystal Skull: A Transparent Mystery

The San Luis Valley in southern Colorado is renowned for the number of people there who have more dollars than sense. People have migrated to the valley from trendy Santa Fe and Telluride, particularly to the old mining town of Crestone located at the base of the Sangre de Cristo mountain range. Although New Agers and adherents to metaphysical science reside throughout the valley, Crestone appears to be the base of operations for the paranormal. There are also several religious organizations in the area. Crestone houses a Carmelite monastery and a Buddhist Ashram, which has the Maha Lakshmi Shop for your incense needs. Hindus are also well represented.

The locals are always trying to expand their minds, and they tend to believe in some farfetched schemes. The Sri Aurobindo Learning Center hosts classes such as "Mother's Agenda of the Supramental Manifestation upon Earth" and "Life Without Death." One person regularly channels an entity named Arcurus through her computer. (The entity instructed her to build a 345-foot pyramid, but the homeowners association put a stop to that one.) According to several people in Crestone, UFOs visit regularly, hundreds of cattle have been mutilated during the past decade by mysterious forces, and several people became unwilling astronauts when they were abducted by aliens.

One of the more famous stories concerns a "crystal skull." Since its discovery in 1994, many locals have been fascinated with a glass skull that a rancher located on her property line. Crystal skulls have been found in archaeology digs in the Yucatan, and local New Agers associate these skulls with such places as Atlantis. This skull soon had quite a reputation for its mystical abilities. This was not just an ordinary crystal skull. It was clearly deformed, and its deformity was cause for concern and speculation. Author and reporter Chris O'Brien, in his book *The Mysterious Valley* (St. Martins, 1996), describes the skull:

> There in [the owner's] hands was a most unusual glass skull! At first glance, it didn't look remotely human. The San Luis Valley Skull, as I've dubbed it, is six inches high and three and a half inches wide, and appears to have been created from a single piece of molten glass. It does not appear to be carved. Its unique form doesn't suggest a typical human skull, rather, it fondly describes it as looking like an "ant person" skull.

The Denver *Rocky Mountain News* sent a reporter to discover the facts. His report (Nov. 10, 1996) states:

> What [the owner] found was a twisted, humanoid skull made of glass. It's got a maniacal grin, and intelligent eyes. It looks a lot like the popular conception of those big-eyed extraterrestrials, although [the owner] says to her it looks like an "ant person." (Alan Dumas, "Valley of Lights San Luis Hamlet of Crestone a Strange Range Where the Deer and Maybe Even Aliens Play")

From the moment the rancher found the skull, all sorts of strange and inexplicable things happened. According to the *Rocky Mountain News* report, "When she brought it back home, a spare tire in the bed of the pickup truck in her yard exploded. Then people began to have bizarre accidents around her house, hitting themselves with hammers and brooms." When an investigator came over to videotape the skull, his camera broke, and no one has been able to repair it, he says. The owner has even reported that the skull does not get dirty.

O'Brien reports that on one occasion a strange odor, reported to be as strong as a broken bottle of women's perfume, "about knocked [the owner's spouse] over."

A psychic told the owner not to sleep near the skull, and to keep it wrapped in cloth in a cedar box. When the skull was placed on public display in Crestone, many residents reported that they felt really strange in the presence of the skull. The owner says a collector of the paranormal from Washington offered her $20,000 for it.

The November 10, 1996, *Rocky Mountain News* article caught the attention of a lot of people, particularly the owners of the property who share the fence line where the skull was found. The owners of the adjacent property, Mr. and Mrs. Chadez, live in the Denver metropolitan area and were surprised to read about this mysterious skull. They were well aware of it because they placed the glass skull on the fence line to act as a cornerstone to their property.

Their son Chad Chadez is a glass blower. At one time he made a number of glass skulls that he took to Santa Fe to sell at Day of the Dead festivities. This particular skull was an ugly second he had no use for, but his parents thought it would make a great property-line marker. Too bad they were not around when the new owners of the neighboring ranch moved in. When the Chadez learned about the "effects" of the skull, they immediately contacted the *Crestone Eagle* to set the record straight (Chris O'Brien, "The San Luis Valley Skull," *Crestone Eagle*, Dec. 1996).

I am sure the person who found the skull now wishes she had sold it to the collector.

—Judy R. Lewallen

Judy Lewallen writes from Colorado Springs.

The Holy Family Church, in Bradford, Pennsylvania, where Rev. Robert M. James was pastor until his suspension after an incident involving holy apparitions. (Photo by Joe Nickell)

'Miracle' Priest Suspended

The pastor of Holy Family Church in Bradford, Pennsylvania—where "divine apparitions" were reportedly seen during early 1997—has been suspended.

Authorities of the parent Western Orthodox Church in America (an Orthodox Catholic denomination) stated they found no evidence that anything miraculous had occurred at the church and said that the priest, Rev. Robert M. James, had failed to follow church procedures.

On January 4, the pastor and two parishioners who were praying in the basement claimed to have heard a noise that led them to the sanctuary. There they said they discovered the shadowy faces of Jesus and Mary on a church wall. Others soon claimed to see the apparitions, but many reported different images, including a trio of angels, the figure of Christ on the cross, and a sacred heart.

Rev. James also claimed he had seen a small statue of the Virgin Mary shed a tear, and he said he smelled roses in the air, which he described as a sure sign of the Virgin's presence.

Thousands flocked to the little clapboard church whose doors were kept open twenty-four hours a day for the following few weeks. "God likes visitors," the pastor said at the time.

One visitor (who wishes to remain anonymous) was a skeptic. He reported: "One of the women showed me some camera shots she had taken of the wood panels on the left side of the church and pointed out some dark lines [apparently in the woodgrain pattern] in which she could discern the head of Christ and the outline of the Virgin. I looked closely and saw nothing." He added: "In this church I saw nothing miraculous in any way. It appeared that those present were fully determined before they came to see supernatural marvels, and they saw what they were determined to see."

—Joe Nickell

The Numerology of Dr. Rashad Khalifa

This is the second of two related columns. The first, "Farrakhan, Cabala, Baha'i, and 19," appeared in the March/April 1997 issue.

In recent years the Muslim who worked the hardest in searching for instances of 19 in the Koran was the late Dr. Rashad Khalifa. After graduating from Ain Shams University in Cairo, where he ranked first in his class, he obtained a master's degree from the University of Arizona, and a doctorate in plant biochemistry in 1964 from the University of California, Riverside. After two years with the Egyptian government, he became a research assistant at the University of Arizona, followed by work for the Monsanto Company in St. Louis.

During 1975 and 1976 Khalifa was science advisor to the Libyan government. He was employed by the United Nations' Industrial Development Organization, in Vienna, before he became a senior chemist in Arizona's State Office of Chemistry in 1980. He published more than twenty scientific papers, a book titled *The Computer Speaks: God's Message to the World*, a 538-page new translation of the Koran, and numerous religious articles and pamphlets. His books and related publications are available from the International Community of Submitters (ICS), P.O. Box 43476, Tucson, AZ 85733.

In 1972 Dr. Khalifa privately printed a monograph titled *Number 19: A Numerical Miracle in the Koran*. He believed this booklet offered for the first time in history physical proof of God's existence. How? By showing beyond all doubt that the Koran must have been written by Allah, and that the text, unlike the Christian Bible, had been perfectly preserved. In a 1980 letter to me he said his results were "so overwhelming that they will inevitably shake the world," although Satan would do all he could to block the great revelation.

I have space for only a tiny selection of claims made by Dr. Khalifa. The Koran has $6 \times 19 = 114$ *suras* (chapters). The number of verses is $19 \times 334 = 6{,}346$, and the digits of that number add to 19. The Koran contains $19 \times 17{,}324 = 329{,}156$ letters. The invocation verse, called the *Basmala* ("In the name of Allah, most gracious, most merciful"), heads every sura except the ninth, but appears an extra time in the middle of Sura 27 (3×9). This invocation contains 19 Arabic letters. Its first word, *Bism*, occurs in the Koran 19 times. Its second word, *Allah*, appears $19 \times 142 = 2{,}698$ times. The third word, *Al-Rahman*, is repeated $19 \times 3 = 57$ times, and the fourth word, *Al-Rahmeen*, occurs $19 \times 6 = 114$ times. The sum of the verse numbers that mention Allah is $19 \times 6{,}217 = 118{,}123$. Thirty different numbers are mentioned in the Koran. These thirty numbers add to $19 \times 8{,}534 = 162{,}146$.

Each of twenty-nine suras is prefixed by a mysterious set of either one, two, three, four, or five disconnected, seemingly meaningless letters. The significance of these letters has long been a mystery. Khalifa claimed to have decoded them, and that they, too, bristle with 19s. Dozens of other findings involving 19 derive from applications of the ancient Arabic gematria.

Dr. Khalifa's research used a computer program that counted the number of times each letter occurred in each sura of the Koran. On the traditional belief that Muhammad could neither read nor write, the embedding of 19 throughout the Koran is proof, Khalifa maintained, that the Koran was dictated by Allah.

Khalifa's writings on 19 sold widely throughout Islamic countries where they became strongly controversial, not only because his numerology tended to support the Baha'i heresy with its emphasis on 19 (see my March/April column), but also because Khalifa rejected the last two verses of Sura 9 as spurious. Why? Because in nine places they violated the secret 19-code. So much for his earlier claim that the text

---

Martin Gardner's latest book is The Last Recreations *(Springer-Verlag, Copernicus, 1997), a collection of twenty-three of his* Scientific American *columns from the last seven years before his retirement from the magazine in 1981.*

of the Koran had been miraculously preserved from corruption!

Attacks on Khalifa increased in Muslim nations. His writings were banned. Muslim scholars likened his numerology to Jewish and Christian gematria. But it was much more than that. Khalifa rejected *Hadith* (words attributed to Muhammad), *Sunnah* (practices said to have been initiated by Muhammad), and *Ijma* (the consensus of scholars about Muslim doctrines). In brief, he rejected Islamic tradition. Like his counterparts among Protestant fundamentalists with respect to the Bible, he held that the Koran was the only reliable source of Islamic beliefs. Islamic leaders were incensed by his demand that the last two verses of Sura 9 be removed. Their fury increased when Khalifa's egotism grew to the point of declaring himself the divine messenger of Allah foretold in the Koran (3:81). Death threats against him steadily mounted.

The Muslim Digest, published in South Africa, strongly attacked Khalifa as a sinister heretic. Its July/October 1986 issue disputed his word counts. The word *Allah*, it is claimed, is in the Koran 2,811 times, not 2,698 as Khalifa said. *Al-Rahman* is there 169 times, not 57 as Khalifa insisted. And so on. "Obviously," an editor wrote, "Dr. Rashad Khalifa's computer needs to brush up on its arithmetic." Earlier attacks on Khalifa are in issues July/August 1981 and March/April 1982.

In 1984 Khalifa initiated an unsuccessful lawsuit of $38 million against the National Academy of Sciences for publishing *Science and Creationism*, a booklet assuming that evolution was a Godless process. On the contrary, Khalifa argued, we know from the Koran and from laws of probability that life could not have arisen without the creative actions of Allah. Each species was independently created, with evolution operating only within a species. We can be certain that God created the first humans from mud because the Koran says so in 32:7 and 15:28.

In Tucson, Dr. Khalifa founded a *masjid* (mosque) where he served as the *imam* (minister). On January 31, 1990—note that the digits of 1990 add to 19—he was assassinated, dying in the mosque's kitchen from multiple stab wounds. He was fifty-four. The alleged assassins were Black Muslims from a fanatical sect called Fuqra. Four members of the sect were arrested in 1993 at their compound near Buena Vista, Colorado, and later charged with murder. One man, John Williams, was convicted. The others jumped bail and vanished. The sect had earlier been implicated in the firebombing of Hare Krishna temples in Denver and Pennsylvania, and a 1983 bombing of a hotel in Portland, Oregon, owned by followers of the East Indian guru Bhagwan Shree Rajneesh.

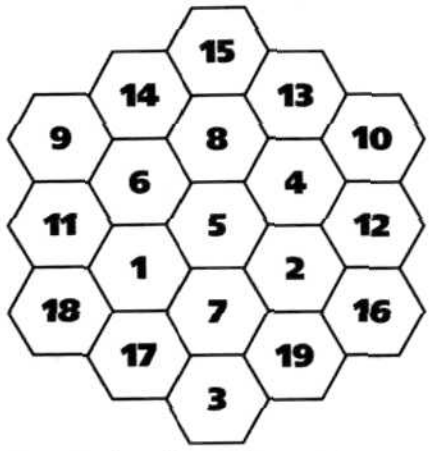


Figure 1. The only possible magic hexagon. Every straight row of cells adds to 38, or twice 19.

What is one to make of Khalifa's numerology? It is, of course, no surprise that many 19s would show up in a book as long as the Koran, but Khalifa's 19s exceed the bounds of chance. The most plausible explanation is that he deceived himself by unconscious fudging. The best account known to me of how easily he could do this is in *Running Like Zebras*, a 1995 book edited by Edip Yuksel, the nation's top Khalifite.

The book contains 19 × 6 = 114 pages (coincidence?) that reprint a debate on the Internet between Yuksel and Daniel (Abdulrahman) Lomax, a Muslim skeptical of Khalifa's findings. He accuses the chemist of careless computer searching, of rejecting two verses of the Koran as spurious because they don't fit his calculations, and of not revealing that versions of the Koran differ in their number of words and letters, and in how they divide suras into verses. Above all, he accuses Khalifa of failing to make clear what he considers a "word."

Many Arabic words have multiple forms, and Khalifa is inconsistent in his counting rules. Sometimes he includes plural forms, sometimes not. Should a word with an affixed pronoun be called one word or two? In English the meaning of *word* is fairly clear because of spaces between words, but in Arabic there are no spaces. Even in English there is vagueness. Lomax's example is *truck*. In counting *truck* in a book should you include *trucks*, *trucked*, and *trucking*? One looks in vain for Khalifa's definition of *word*.

Lomax likens the doctor to those astronomers who once fancied they could see canals on Mars. He concludes: "Dr. Khalifa's claims, at best, fall into the category of pious fraud. . . . Had God intended the Qur'an to carry a code verifying its perfect preservation, he could have done it much more effectively and simply than the complex, arbitrary, and inconclusive 'code' claimed by Dr. Khalifa."

Yuksel, of course, believes he has completely demolished all of Lomax's objections. His curious book is available from his Monotheist Productions, P.O. Box 43476, Tucson, AZ 85733.

Now for some 19 number juggling, supplied in part by correspondent Monte Zerger. Nineteen is, of course, a prime. It is equal to $10^2 - 9^2$; to $1^2 + 3^2 + 3^2$; and to $3^3 - 2^3$. The number 1,729, or 19 × 91, was involved in a famous incident between the British mathematician G. H. Hardy and his friend Ramanujan, the Indian number-theory genius. Having taken a taxi to visit Ramanujan in a hospital, Hardy remarked that the taxicab number, 1,729, was a dull number. Ramanujan immediately replied, "No, it is an interesting number. It is the smallest number expressible as the sum of two cubes in two different ways [$12^3 + 1^3$ and $10^3 + 9^3$]." Note that the digits of 1,729 add to 19.

In 1989 (a multiple of 9) it was proved

FRINGE-WATCHER

continued on page 58

Extraterrestrial Iconography

In a manner similar to the evolution of Jesus's features in art (Nickell 1988, 41–48), or of the popular likeness of Santa Claus (Flynn 1993), the concept of what alien creatures look like has undergone change over time. In the course of graduate work I did in folklore in 1982 and subsequently published (Nickell 1984), I noted (citing Stringfield 1980) that the descriptions of UFO occupants were tending to become standardized, a process that continues at present.

Consider, for example, the development beginning with the origin of the modern UFO era in 1947. (Although many alien encounters were reported prior to 1947, most of the reports were not made public until after that year, typically with great lapses in time between the alleged date of the encounter and the date of reporting [Vallee 1969, 179–90]. Therefore, there is reason to distrust the accuracy of such reports.) Several sources show the great variety of aliens described in the post-1947 era (Clark 1993; Cohen 1982; Hendry 1979; Huyghe 1996; Lorenzen and Lorenzen 1977; Mack 1994; McCampbell 1976; Sachs 1980; Stringfield 1977, 1980; Story 1980; Vallee 1969).

One notes the "little green men" reported in Italy in 1947 (Cohen 1982, 203–205); the beautiful, humanlike beings who appeared to the "contactees" of the 1950s (Story 1980, 89); the hairy dwarfs common in 1954 (Clark 1993, 177); and the many other varieties of alien beings reported in encounters down to the present. The accompanying illustration depicts a selection of such beings reportedly encountered from 1947 to the present. (Science fiction examples have not been included.) Prepared for a Discovery channel documentary on alien abductions (forthcoming as of this writing), it also appeared April 4, 1997, on ABC's *20/20* in a documentary on the "Alien Autopsy" hoax. There I used it to demonstrate that the aliens that were allegedly retrieved from the 1947 Roswell, New Mexico, UFO crash (actually the crash of an array of Project Mogul balloons carrying radar reflectors and instruments) were of a type not popularly imagined until many years later.

That type begins to appear in 1961, the date of the first widely reported alien abduction—the Betty and Barney Hill case. It is the little, big-headed humanoid with large, wraparound eyes. The mythological implication of this type seems to be that the aliens are "time travelers"—in effect *us* as it is assumed we *will be* in our distant evolutionary future (Nickell 1984). Therefore, they have dwindling bodies (because of inactivity) and large brains (due to increased intelligence). However, some critics are skeptical of all such human/humanoid models. States one early commentator: "While it seems incredible that life does not exist elsewhere in the universe, it is equally incredible that it should resemble man" (Palmer 1951, 64).

Nevertheless, due to media influence, this is the type that eventually became standardized. It is the alien image now seen everywhere—on caps, T-shirts, ties, necklaces, posters, and books, even the coffee mug on my desk.

References

Clark, J. 1993. *Unexplained.* Detroit: Visible Ink.

Cohen, D. 1982. *The Encyclopedia of Monsters.* New York: Dorsett Press.

Flynn, T. 1993. *The Trouble with Christmas.* Buffalo, N.Y.: Prometheus Books.

Hendry, A. 1979. *The UFO Handbook.* New York: Doubleday.

Huyghe, P. 1996. *The Field Guide to Extraterrestrials.* New York: Avon Books. (I relied heavily on this source, and Vallee 1969.)

Lorenzen, C., and J. Lorenzen. 1977. *Abducted: Confrontations with Beings from Outer Space.* New York: Berkeley Medallion Books.

Mack, J. 1994. *Abduction.* New York: Ballantine.

McCampbell, J. M. 1976. *UFOLOGY: A Major Breakthrough in the Scientific Understanding of Unidentified Flying Objects.* Millbrae, Calif.: Celestial Arts.

Nickell, J. 1984. The 'Hangar 18' tales: A folkloristic approach. *Common Ground* (England), June.

———. 1988. *Inquest on the Shroud of Turin,* updated ed. Buffalo, N.Y.: Prometheus Books.

Palmer, R. 1951. New report on the flying saucers. *FATE,* January, 63–81.

Sachs, M. 1980. *The UFO Encyclopedia.* New York: Perigree Books.

Stringfield, L. H. 1977. *Situation Red: The UFO Siege.* Garden City, N.Y.: Doubleday & Co.

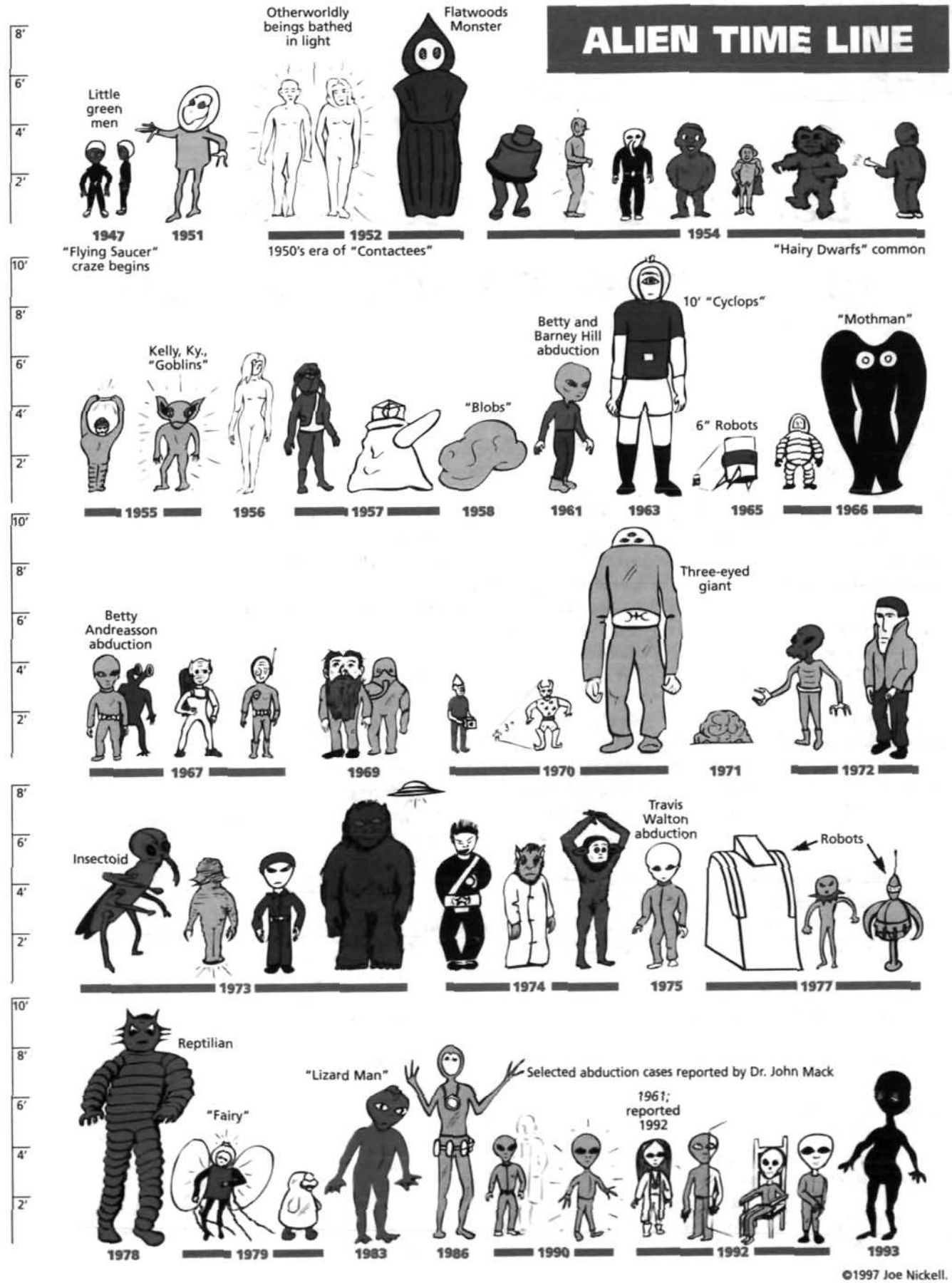
———. 1980. *The UFO Crash/Retrieval Syndrome.* Seguin, Tex.: Mufon.

Story, R. D. 1980. *The Encyclopedia of UFOs.* Garden City, N.Y.: Doubleday & Co.

Vallee, J. 1969. *Passport to Magonia: From Folklore to Flying Saucers.* Chicago: Henry Regnery Co.

Acknowledgments

I am grateful to Chris Kuzniarek, SKEPTICAL INQUIRER's art director, for her computer-graphics assistance with the Alien Time Line.


ALIEN TIME LINE
8'
6'
4'
2'
10'
Little green men
1947
"Flying Saucer" craze begins
1951
Otherworldly beings bathed in light
Flatwoods Monster
1952
1950's era of "Contactees"
1954
"Hairy Dwarfs" common
Kelly, Ky., "Goblins"
1955
1956
1957
"Blobs"
1958
Betty and Barney Hill abduction
1961
10' "Cyclops"
1963
6" Robots
1965
"Mothman"
1966
Betty Andreasson abduction
1967
1969
Three-eyed giant
1970
1971
1972
Insectoid
1973
Travis Walton abduction
1974
1975
Robots
1977
Reptilian
1978
"Fairy"
1979
"Lizard Man"
1983
1986
Selected abduction cases reported by Dr. John Mack
1990
1961; reported 1992
1992
1993
©1997 Joe Nickell.

MEDIA WATCH

C. EUGENE EMERY JR.

Dark Skies Uses Pseudo-Sagan to Recast Astronomer's Motives

Only five months after his death, astronomer Carl Sagan was turned into a government conspirator in the worldwide UFO coverup by the NBC television drama *Dark Skies*.

The show, which airs Saturday nights, recasts major historical events, beginning with the Kennedy assassination, as part of a UFO invasion and coverup, asserting in the opening credits that "History as we know it is a lie."

The May 24 episode, set during the Vietnam War era, suggested that Sagan's lifelong quest to find evidence for extraterrestrial intelligence was fueled, in part, by a secret meeting with the director of the top-secret Majestic-12 project. In the *Dark Skies* version of history, a young Sagan comes face to face with a living space alien, learns that extraterrestrial parasites have been seizing control of humans, and develops a way to identify people who have been infected with one of the parasites.

"How many planets are out there, doctor? How many galaxies, how many worlds?" the Majestic chief asks Sagan as he stares at the alien.

It's an excuse to get the Sagan impersonator to say "billions and billions."

"Well, somewhere out there is the planet that thing came from," the director says. "I need you to search the stars, doctor, to find that planet."

The encounter is supposed to explain why Sagan became such a proponent for the Search for Extraterrestrial Intelligence (SETI) program.

The show was riddled with errors. It made a reference to the Planetary Society (which wasn't founded until 1981), cited Sagan's doctoral dissertation at Cornell University (he got his doctorate at the University of Chicago), and credited him with the idea that our radio and television transmitters are sending signals into space (a theory Sagan embraced but did not originate).

But those are minor compared to the way the show's executive producers, Bryce Zabel and James D. Parriott, shamelessly chose to turn Sagan, who passionately argued that there was no convincing evidence that UFOs were extraterrestrial spacecraft, into a hypocrite and government conspirator.

Even if the show had aired before his death, it is not clear that Sagan, a public figure, could have done anything about the *Dark Skies* portrayal. To successfully sue, public figures must prove malice, which is extremely difficult. Dead people cannot be libeled.

Sagan's widow, Ann Druyan, said before the program aired that she was unaware that Sagan was going to be portrayed on the show. She later called the episode "terribly silly," in part because of the errors.

"When you think of what's possible with the media, and then see what impoverished and pathetic programs we actually get," she said, "it's really dismal."

Dark Skies was not renewed for NBC's fall schedule.

* * *

Carol Araujo must have been one of the proudest women in Rhode Island last Mother's Day. She had been named "Mother of the Year" after her thirty-three-year-old autistic daughter, Tammy Galuska, submitted an essay explaining how Mrs. Araujo "sacrificed a year of her life to teach me how to communicate."

"She has given me a new life. I reached a time in my life where she was the only one who believed that I could learn to communicate. Mere understanding is death to a non-verbal person." These were the winning words Tammy wrote.

Or did she?

At the age of two, Tammy showed signs of retardation and was eventually diagnosed with Retts Syndrome, a severe brain disorder that only affects girls.

The 154-word essay was created using facilitated communication (FC), a questionable technique in which a helper (or "facilitator") holds the hand, wrist, or finger of the person and "helps" them point to letters on a board or keys

Gene Emery is a science and medical writer. His weekly computer software column appears on the Reuters news service. His address is 46 Highland Street, Cranston, RI 02920. His e-mail address is gene.emery@prodigy.com.

on a computer. Test after test has shown that it is the facilitator, not the handicapped person, who subconsciously determines what letters will be touched.

When WPRI-TV in Providence did a Mother's Day feature on Mrs. Araujo and Tammy, the reporter showed Mrs. Araujo grasping three of Tammy's fingers and bringing the young woman's index finger to a specially designed computer so a key could be pushed. Tammy's job coach, Andrea Healey, a caseworker with *RI ARC, a Pawtucket, Rhode Island,* association that helps the handicapped, was the one who held Tammy's hand when the essay was written.

Testing a person who claims to be communicating through FC is easy: See if the person can identify a simple picture when nobody else in the room (especially the facilitator) knows what it is. In 1994, when I tested four Rhode Island people who supposedly were spelling out messages through FC, all four lost their ability when the facilitator didn't know the correct answer. One of them was Tammy.

Unfortunately, too many people—including reporters, contest judges, and folks who work with the handicapped—aren't even aware of the controversy surrounding FC and wouldn't know how to conduct a proper test.

"Tammy's touching story moved the hearts of the judges to choose Carol Araujo," according to a news release from radio station WARV, the chief sponsor of the contest. Station spokesman Emanuel DaCunha later reported that neither the station nor the judges were aware that there was controversy surrounding the technique used to created the essay. The station learned the circumstances of Tammy's life by talking to Healey, an avid believer in FC.

In an interview, Healey said she is aware of the controversy but believes Tammy is truly communicating even though Tammy has never passed a simple double-blind test.

"Tammy doesn't want to hear a word about validation or anything else like that," said Healey. "Tammy gets highly insulted when she is put in a position of having to prove anything to people who are skeptical." Healey's information about what Tammy is thinking, of course, comes from the FC messages.

Carol Araujo's unshakable conviction that she has helped her daughter reestablish communication with the world may make her worthy of a Mother of the Year award. But there was a second-place finisher in the contest who lost a richly deserved honor because people don't know a bogus technique when they see it.

* * *

Finally, let's have a moment of silence for the media professionals of the Denver Press Club. Never has a group of journalists worked so hard to lose a Pulitzer Prize.

It seems the press club building has been haunted for at least eighty years by four now-deceased reporters whose interest in poker has persisted long after they officially cashed in their chips.

After putting up with a toilet that seemed to flush by itself and miscellaneous knocking sounds, club officials brought in "psychic Cleo of Spirit Clearings" and her sidekick, Eshaya, on September 23, 1996.

Cleo sensed the presence of the poker players and also claimed to get vibes from (a) the ghost of a woman murdered twenty-five years earlier, (b) a hanged body (one too many changes by copy editors, perhaps), and (c) a reporter standing lookout at the club.

Now, in anybody's book, being able to produce long-sought proof that an afterlife exists would be the scoop of the century—if not the millennium.

But how did the reporters of the Denver Press Club react?

According to the January 18 *Editor & Publisher* (pp. 8–9), they asked Cleo and Eshaya to get rid of the ghosts! (Colorado's crooked politicians must love being covered by a press corps that destroys the evidence.)

Fortunately, although the spirit of the murdered woman was sent "home" to her final rest, the poker players and their lookout refused to shuffle off, according to the *E&P* article.

Thus, the journalists in Denver still have a chance to redeem themselves.

With the spirits still floating around, and with the press club "documenting" the ghosts with fuzzy infrared photographs (available on the Internet at http://www.pressclub.org/ghosts/pictures.htm), perhaps one of the club's members will recognize the importance of this discovery, call in a team of real scientists with infrared detectors, find proof of the hereafter, and get that Pulitzer for investigative reporting after all. □

Two Easy Ways

to reference your issues of

Skeptical Inquirer

Binders

in the small ($8.95) or large ($10.95) format.

Large-format binder holds up to 20 issues. Small holds up to 8.

To order make your check payable to **CSICOP** *and return to:*

CSICOP
PO Box 703
Amherst, NY 14226

MasterCard or Visa orders may call **toll-free**

1-800-634-1610

The Truth Is, They Never Were 'Saucers'

June 24 marked the fiftieth anniversary of the day UFOs were discovered, or else invented, whichever you prefer. On that date in 1947, pilot Kenneth Arnold reported seeing nine airborne objects, and the era of "flying saucers" was begun. Lost in all the excitement was a very simple, yet fundamental error. As skeptic Marty Kottmeyer points out, Arnold didn't say that the objects *looked* like saucers. Instead, Arnold told a reporter that "they flew erratic, like a saucer if you skip it across the water." Actually, what he said was that they looked like boomerangs, but the reporter's account called them "flying saucers." And since newspapers were soon filled with reports of "flying saucers" in the skies, "flying saucers" are what people reported seeing, not "flying boomerangs." Seldom has the power of suggestion been so convincingly demonstrated. Kottmeyer asks, "Why would extraterrestrials redesign their craft to conform to [the reporter's] mistake?"

By now, however, the Arnold sighting has been forgotten by all but the long-time saucer fans. Sightings alone fail to excite the masses, at least in North America: to be newsworthy these days, a saucer must either abduct and molest somebody, or better yet, crash. (In other countries, UFOs can still make big headlines by merely flying around.)

Today, the early days of the saucer era are primarily remembered not for Arnold's sighting, but for Roswell, where a UFO is supposed to have crashed just eight days after Arnold discovered (or invented) them. As expected, UFO promoters held a big bash in early July to celebrate the happy occasion. Hotel rooms in Roswell and the vicinity were booked solid for the Roswell UFO Encounter 97 festival, which, for a modest fifty dollars per person, promised an all-night rock concert. There was an alien film festival, an extraterrestrial costume party, and tours of several of the sites claimed to be the "true crash site." Television reports of alien events seemed nonstop, with coverage across the board from the trash-titillators to the "serious" news organizations.

According to the *Albuquerque Journal* (April 17), a number of prominent sponsors backed out of the festival after the mass suicide of the UFO cult Heaven's Gate in March because they were reluctant to be identified in any way with something that reeks, however faintly, with the stench of death. Roswell promoters had to scramble to put on a scaled-down concert.

But even that proved elusive. One would-be promoter of the cosmic event before the major sponsors pulled out said his lawyer had informed him that he didn't need a permit to put on his ET entertainment extravaganza. The County Attorney, however, insisted that he did and threatened him with jail and fines. The Roswell promoters, tireless in getting to the bottom of unfathomable mysteries, were thwarted by their own failure to apply to the county for a permit. The few bands who came to Roswell ended up holding a Sunday afternoon jam session in the parking lot of the Roswell Inn Hotel, hoping to raise just enough money to get home. In January 1997, the attendance at the festival was projected to be 150,000. By March, that estimate had fallen to 60,000. The actual figure seems to have been closer to 30,000 (see the UFO Encounter 97 Web site at http://www.rt66.com/%7Eroswell/).

Despite all the excitement over Roswell festivities and the financial returns therefrom, all does not sit well with the crash story today. Philip J. Klass reports in his *Skeptics UFO Newsletter* (May 1997) that Jim Ragsdale, one of the supposed "crash recovery" witnesses whose account is currently touted as among the most credible, has contradicted himself yet again by moving the crash site dozens of miles from where he first had it. Some

Robert Sheaffer's World Wide Web page for UFOs and other skeptical subjects is at http://debunker.com/~sheaffer/ufo.html.

charge that this was done to make it easier for Pilgrims wishing to visit the historic site. Stanton Friedman, the "flying saucer physicist," says that he trusts Ragsdale's account, but he did not specify which version of Ragsdale's shifting story he believes. Presumably, he believes all of them simultaneously.

Meanwhile, the account of former mortician Glen Dennis, once touted by Friedman and others as among the "best evidence" for Roswell, is rapidly losing credibility among Roswell researchers who have been trying to substantiate it. Even arch-Roswell-promoter Kevin Randle is backing away from Dennis. Klass further reports that Kent Jeffrey, who only recently was organizing the International Roswell Initiative to uncover the supposed coverup, has publicly disavowed the whole crashed-saucer story (see the Roswell Initiative Web page at http://www.roswell.org for a full explanation of why Jeffrey changed his mind), as has onetime supporter Karl Pflock.

But if the truth isn't to be found at Roswell, it's still "out there" somewhere, and the Center for the Study of Extraterrestrial Intelligence, CSETI (not to be confused with scientific SETI organizations), is determined to find it. Steven Greer, M.D., the head of that organization, was in Washington, D.C., in April to call for congressional hearings into the alleged government coverup. This is a group that claims on its Web page (http://www.cseti.com) to have "successfully established contact with extraterrestrial spacecraft in the United States, England, Mexico, and Belgium." They shine a beacon or strobe at lights in the sky believed to be UFOs; if the object flashes or twinkles in apparent response, that's "contact." Sometimes, they report, UFOs that wish to hide zoom up high into the sky and blend in with the stars. Somehow, this technique has succeeded in fooling all of the world's astronomers, who have not yet spotted the interlopers amid their charts. The CSETI Web page also plays weird sounds of unspecified origin suggestive of the giant insects of classic bad sci-fi films. I have been told that these are sounds purportedly recorded during UFO sightings, sometimes from inside crop circles.

While in Washington, CSETI held several briefings for the press and congressional aides, parading a group of witnesses who claimed to be able to offer dramatic testimony of UFO encounters—if the government would release them from supposed vows of silence. That prosecution of anyone on charges of "revealing UFO secrets" would be virtually impossible, since the very attempt to prosecute them would be the story of the millennium, seems not to have occurred to anyone. A *Boston Globe* story reported that "Greer, [former astronaut Edgar] Mitchell, and a panel of 'witnesses' asserted that several extraterrestrial civilizations—working together from bases within the solar system and possibly from temporary outposts under water on Earth—regularly visit the planet and are prepared for wide-scale contact with humans."

After finishing up its business in Washington, CSETI announced that its next project was its June "Advanced Researchers' Training and Retreat in Crestone, Colorado, where UFOs are regularly seen" (see News and Comment story, "San Luis Valley Crystal Skull," this issue). But rather than coming to Washington to tell the press stories of past UFO encounters, why didn't they just invite them out to Crestone, to see for themselves? Unless, that is, what CSETI is calling "UFOs" others might call "satellites" and "airplanes." □

(Alien drawing courtesy of David E. Thomas/NMSR.)

We invite you to become a

CSICOP ASSOCIATE MEMBER

By being a *Skeptical Inquirer* subscriber you have the opportunity to become a CSICOP Associate Member.

These are some of the benefits you will receive as an Associate Member:

- 10% discount on *Skeptical Inquirer* conference and seminar registration
- 10% discount on *CSICOP* videotapes, audiotapes, T-shirts, and other merchandise
- 10% discount on selected Prometheus Books of special interest to skeptics
- Personalized membership card
- Four exciting issues a year of the ***Skeptical Briefs***, the thought-provoking and informative CSICOP newsletter available *exclusively* to Associate Members.

❑ Enter my subscription to the *Skeptical Inquirer*
❑ one year ($32.50) ❑ two years ($54.00) ❑ three years ($75.00)

❑ Also enclosed are my dues as a *CSICOP Associate Member*
❑ one year ($18.00) ❑ two years ($32.00) ❑ three years ($45.00)

❑ I am already a subscriber and would like to become a *CSICOP Associate Member*
My subscription account number is _____
(This number appears above your name on your *Skeptical Inquirer* mailing label.)
❑ one year ($18.00) ❑ two years ($32.00) ❑ three years ($45.00)

Total $_____

❑ Check or money order enclosed • Charge my ❑ MasterCard ❑ Visa

Card # _____ Exp. _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

Please make checks payable to CSICOP and return to:
CSICOP Associate Members, P.O. Box 703, Amherst, NY 14226-0703
Credit card orders may call toll-free 1-800-634-1610 or FAX (716) 636-1733
*I understand that as a **CSICOP Associate Member** I do not represent CSICOP, nor can I speak or write on behalf of CSICOP or its publications.*

Americans are reportedly spending about $14 billion per year on health-related therapies that have not been scientifically validated and are collectively referred to as "alternative" or "complementary." These range from psychic healing and intercessory prayer to alternative cancer treatments, aromatherapy, homeopathy, and acupuncture. Although many of these therapies are said to be effective because they have been used since ancient times, attempts have been made to rationalize them using modern scientific language.

In a symposium titled "Alternative Medicine in a Scientific World" at the 1997 annual meeting of the American Association for the Advancement of Science in Seattle, a panel of scientists and researchers considered this topic. The session was organized by Ursula Goodenough of the Department of Biology at Washington University, St. Louis, and Robert L. Park of the Department of Physics at the University of Maryland and the American Physical Society. Speakers evaluated and discussed the extent to which the claims of alternative therapies are consistent with the laws of physics, the nature of the evidence cited to support the efficacy of alternative treatments, the reasons why bogus therapies seem to work, the role of antiscience in the advocacy of alternative therapies, and the relationship between alternative practices and cultural relativism.

The first five articles in this issue are based on five of the papers presented at that symposium. A sixth paper, on assertions about shark cartilage, was submitted independently to the SKEPTICAL INQUIRER *and has been included because of its relevance.*

Alternative Medicine and the Laws of Physics

The mechanisms proposed to account for the alleged efficacy of such methods as touch therapy, psychic healing, and homeopathy involve serious misrepresentations of modern physics.

ROBERT L. PARK

So-called "alternative" therapies, mostly derived from ancient healing traditions and superstitions, have a strong appeal for people who feel left behind by the explosive growth of scientific knowledge. Paradoxically, however, their nostalgia for a time when things seemed simpler and more natural is mixed with respect for the power of modern science (Toumey 1996). They want to believe that

"natural" healing practices can be explained by science. Purveyors of alternative medicine have, therefore, been quick to invoke the language and symbols of science. Not surprisingly, the mechanisms proposed to account for the alleged efficacy of such methods as touch therapy, psychic healing, and homeopathy involve serious misrepresentations of modern physics.

The No-Medicine Medicine

Homeopathy, founded by a German physician, Samuel Hahnemann (1755–1843), is a relative newcomer. Homeopathy is based on the so-called "law of similars" (*similia similibus curantur*), which asserts that substances that produce a certain set of symptoms in a healthy person can cure those same symptoms in someone who is sick. Although there are related notions in Chinese medicine, Hahnemann seems to have arrived at the idea independently. Hahnemann spent much of his life testing natural substances to find out what symptoms they produced and prescribing them for people who exhibited the same symptoms. Although the purely anecdotal evidence on which he based his conclusions would not be taken seriously today, homeopathy as currently practiced still relies almost entirely on Hahnemann's listing of substances and their indications for use.

Natural substances, of course, are often acutely toxic. Troubled by the side effects that often accompanied his medications, Hahnemann experimented with diluting them. After each successive dilution, he subjected the solution to vigorous shaking, or "succussion." He made the remarkable discovery that although dilution eliminated the side effects, it did not diminish the effectiveness of the medications. This is rather grandly known as "the law of infinitesimals."

Hahnemann actually made a third "discovery," which his followers no longer mention. "The sole true and fundamental cause that produces all the countless forms of disease," he writes in his *Organon*, "is psora." Psora is more commonly known as "itch." This principle does not seem to involve any laws of physics and is in any case ignored by modern followers of Hahnemann.

By means of successive dilutions, extremely dilute solutions can be achieved rather easily. The dilution limit is reached when the volume of solvent is unlikely to contain a single molecule of the solute. Hahnemann could not have known that in his preparations he was, in fact, exceeding the dilution limit. Although he was contemporary with the physicist Amadeo Avogadro (1776–1856), Hahnemann's *Organon der Rationellen Heilkunde* was published in 1810, one year before Avogadro advanced his famous hypothesis, and many years before other physicists actually determined Avogadro's number. (Avogadro showed that there is a large but finite and specific number of atoms or molecules in a mole of substance, specifically 6.022×10^{23}. A mole is the molecular weight of a substance expressed in grams. Thus, a mole of water, H_2O, molecular weight $2 + 16 \approx 18$, is 18 grams. So there are 6.022×10^{23} water molecules in 18 grams of water.)

Modern day followers of Hahnemann, however, are perfectly aware of Avogadro's number. Nevertheless, they regularly exceed the dilution limit—often to an astonishing extent. I recently examined the dilutions listed on the labels of dozens of standard homeopathic remedies sold over the counter in health stores, and increasingly in drug stores, as remedies for everything from nervousness to flu. These remedies are normally in the form of lactose tablets on which a single drop of the "diluted" medication has been placed. The "solvent" is usually a water/alcohol mixture. The lowest dilution I found listed on any of these bottles was 6X, but most of the dilutions were 30X or even, in the case of oscillococcinum, an astounding 200C. (Oscillococcinum, which is derived from duck liver, is the standard homeopathic remedy for flu. As we will see, however, its widespread use poses little threat to the duck population.)

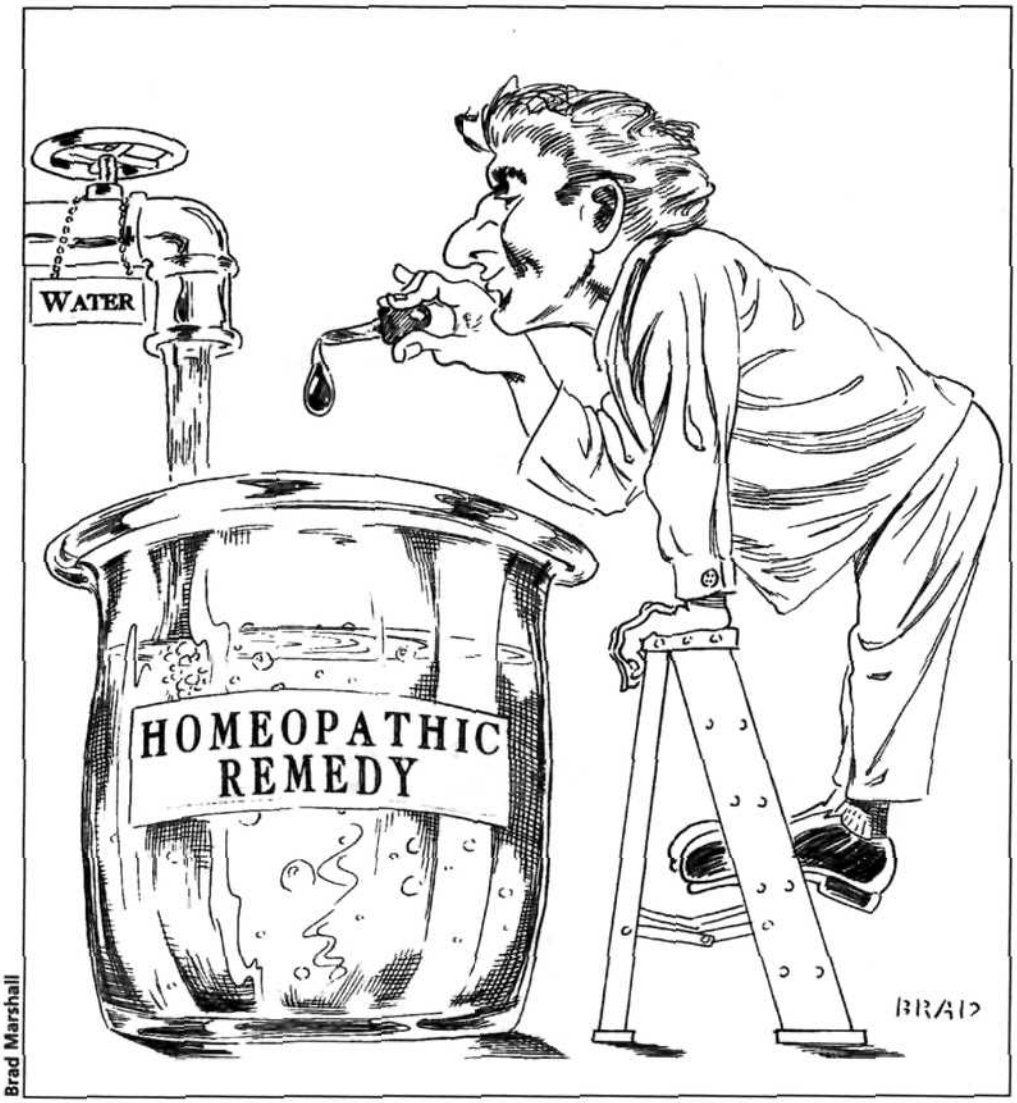
The public is spending billions of dollars annually on sugar pills to cure their sniffles, hand waving to speed recovery from operations, and good thoughts to ward off illness, all with assurances that it's based on science.

What do these notations mean? The notation 6X means that the active substance is diluted 1:10 in a water-alcohol mixture and succussed. This procedure (diluting and succussing) is repeated sequentially six times. The concentration of the active substance is then one part in ten raised to the sixth power (10^6), or one part per million. An analysis of the pills would be expected to find numerous impurities at the parts-per-million level.

The notation 30X means the 1:10 dilution, followed by succussion, is repeated thirty times. That results in one part in 10^{30}, or 1 followed by thirty zeroes. I don't know what the name for that number is, but let me put it this way: you would need to take some *two billion pills*, a total of about a thousand tons of lactose, to expect to get even one molecule of the medication. In other words, the pills contain nothing but lactose and the inevitable impurities. This is literally no-medicine medicine.

And what of 200C? That means the active substance is sequentially diluted 1:100 and succussed two hundred times. That would leave you with only one molecule of the active substance to every one hundred to the two hundredth power molecules of solvent, or 1 followed by four hundred zeroes (10^{400}). But the total number of atoms in the entire universe is estimated to be about one googol, which is 1 followed by a mere one hundred zeroes.

Robert L. Park is in the Department of Physics, University of Maryland, College Park, MD 20742.



Brad Marshall

This is the point at which we are all supposed to realize how ridiculous this is and share a good laugh. But homeopaths don't laugh. They've done the same calculation. And while they agree that not a single molecule of the active substance could remain, they contend it doesn't matter, the water/alcohol mixture somehow *remembers* that the substance was once there. The process of succussion is presumed to charge the entire volume of the liquid with the same memory. Is there any evidence for such a memory?

Smart Water?

Homeopaths have been administering this sort of no-medicine medicine for two centuries. Most scientists, however, first became aware of their extraordinary claims when *Nature* published a paper by French epidemiologist/homeopathist Jacques Benveniste and several colleagues, in which he reported that an antibody solution continued to evoke a biological response even if it was diluted to 30X—far beyond the dilution limit (Davenas et al. 1988). Benveniste interpreted this as evidence that the water somehow "remembered" the antibody.

In reaching that conclusion, Benveniste turned conventional scientific logic on its head. A large part of experimental science consists of devising tests to insure that an experimental outcome is not the result of some subtle artifact of the conduct or design of the experiment. "Infinite dilution" is one such procedure used by chemists. The effect of some reagent, for example, is plotted as a function of concentration. If at low concentrations, the plot does not extrapolate through the origin, it is taken as proof that the observed effect is due to something other than the reagent. By Benveniste's logic, it's evidence that the reagent leaves some sort of imprint on the solution that continues to produce the effect.

Attention had been called to Benveniste's article by the editor of *Nature*, John Maddox, who pointed out in an editorial that Benveniste had to be wrong (Maddox 1988). Because the reviewer could not point to any actual mistake, *Nature* had agreed to publish the article in the spirit of open scientific exchange. Reviewers, of course, have no way of knowing if the author faithfully reports the results of the measurement, or whether the instruments employed are faulty. Nevertheless, the existence of this one paper published in a respected journal has been widely trumpeted by the homeopathic community as proof that homeopathy has a legitimate scientific basis.

The Maddox editorial encouraged other scientists to repeat the Benveniste experiments. An attempt to replicate the work as precisely as possible was reported by Foreman and colleagues in *Nature* in 1993 (Foreman et. al. 1993). The authors found that "no aspect of the data is consistent with [Benveniste's] claim." I am aware of no work that replicates Benveniste's findings. Why was Foreman's water dumber than Benveniste's? We will return to that question.

Quite apart from the matter of how the water/alcohol mixture remembers, there are obvious questions that cry out to be

asked: 1) Why does the water/alcohol mixture remember the healing powers of an active substance, but forget the side effects? 2) What happens when the drop of solution evaporates, as it must, from the lactose tablet? Is the memory transferred to the lactose? 3) Does the water remember other substances as well? Depending on its history, the water might have been in contact with a staggering number of different substances.

A number of mechanisms have been proposed to account for this miraculous memory. These mechanisms are discussed by Wayne Jonas in his recent book, *Healing with Homeopathy, coauthored by Jennifer Jacobs (Jonas and Jacobs 1996). Jonas* is the Director of the Office of Alternative Medicine of the National Institutes of Health and is identified on the book jacket as one of "America's leading researchers of homeopathic medicine." Jonas appears, at the very outset, to acknowledge the possibility that the effect of homeopathic medicine may "turn out to be only a placebo effect." But as we will see, in alternative medicine circles the placebo effect can be the weirdest explanation of all.

If it is not a placebo effect, Jonas says, the "information" from the active substance must be stored in some way in the water/alcohol solution, perhaps in the structure of the liquid mixture. There has been an abundance of speculation about what sort of "structure" this might be: clusters of water molecules arranged in specific patterns (Anagnostatos 1994); arrangements of isotopes such as deuterium or oxygen-18 (Berezin 1990); or "coherent vibration" of the water molecules (Rubik 1990). I could not find a single piece of evidence supporting any of these speculations, and there are sound scientific reasons for rejecting each of them. Jonas refers to structural studies showing regions of local order in liquids. A "snapshot" of the structure of a water/alcohol mixture will of course show regions of local order, but these are transient; they cannot persist beyond the briefest of relaxation times depending on the temperature. That not even local order can persist is the definition of a liquid. The problem, of course, is entropy. The *second law of thermodynamics* is the most firmly established of all natural laws, but even if you could somehow repeal the second law, you would still confront the question of how this stored information can be communicated to the body.

The Illusive Biophoton

One possibility, according to Jonas, is that information is transferred by "bioelectromagnetic energy." Here he cites, as "some of the most carefully executed work in this area," studies of the effect of serially agitated dilutions of frog thyroxine on highland frogs that are in the climbing stage of metamorphosis (Endler et al. 1994). Thyroxine is reported to increase the climbing rate of the frogs—and the response continues even after the thyroxine dilutions are taken far beyond the dilution limit. In other words, when it is certain that there is no thyroxine.

That would appear to be clear evidence that something other than thyroxine is responsible for the stimulation of the frogs. In this case, for example, it might be the alcohol that is producing the climbing response, or some impurity, or the frogs might be stimulated by the act of administering the medication, or there might be subconscious bias on the part of the experimenter in deciding whether the frogs are stimulated. Once again, however, scientific logic is turned on its head; the results are interpreted as evidence that an imprint of thyroxine has somehow been left in the water.

But even if the water contains information about thyroxine, how is this information communicated to the frogs? *Rather than administering the water/alcohol solution directly* to the frog, the researchers tried putting the solution in a sealed glass test tube and placing it in the water with the frogs. The frogs still responded. Why am I not surprised?

What conclusion did the researchers come to? They concluded that information that once resided in the molecular structure of the active substance, and which was then somehow transferred to the succussed water, must have been transmitted to the frogs via a "radiant" effect, perhaps an illusive "biophoton." No evidence of such radiation has been reported. Benveniste, however, now claims that a 50Hz magnetic field can erase the memory of his antibody solutions (Benveniste 1993), which might explain why other researchers do not find a memory. This electromagnetic link led Benveniste to the further discovery that he can "potentize" your water over a telephone line.

One possibility, according to Jonas, is that information does not pass from the solution to the frog—or from a medication to a human patient—but the other way. The unhealthy state of the patient might be "released through the remedy." "Such speculative theories," Jonas admits, "need further experimental work to confirm or disprove them."

The Case Against Butterflies

Jonas also speculates that chaos theory might offer insight into the effect of homeopathic remedies on the body's self-healing mechanisms:

> One concept in chaos theory is that very small changes in a variable may cause a system to jump to a very different pattern of activity, such as a small shift in wind direction drastically affecting climatic patterns of temperature and precipitation. Under this way of thinking, the homeopathic remedy can be seen as a small variable that alters the symptom pattern of an illness. (Jonas and Jacobs 1996, 89)

This dreadful shibboleth betrays a total misunderstanding of what chaos is about. "Chaos" refers to complex systems that are so sensitive to initial conditions that it is not possible to predict how they will behave. Thus, while the flapping of a butterfly's wings might conceivably trigger a hurricane, killing butterflies is unlikely to reduce the incidence of hurricanes. As for homeopathic remedies that exceed the dilution limit, a better analogy might be to the flapping of a caterpillar's wings.

Psychic Healing

But if none of these mechanisms work, Jonas says, "highly speculative and imaginary [*sic*] explanations may be necessary." What he has in mind is the placebo effect. "Belief in a therapy," Jonas explains, "may be an important factor in healing." Who would disagree? If it is a placebo effect at work in homeopathy, all of the pseudoscientific trappings of *similia similibus curantur* and the law of infinitesimals merely serve as props to deceive people into believing that sugar pills are medicine. But "placebo effect," as used by Jonas and other proponents of alternative medicine, turns out to be the strangest beast of all. It is suffused with the New Age notion of a universal consciousness. The placebo effect becomes psychic healing. Again from Jonas:

> Some theorists suggest that intentionality and consciousness must be brought to any explanation of how nonlocal, and nonspecific quantum potentials might be "collapsed" into so-called informational coherence patterns (molecules), which then have specific effects. Once these previously unstable and nonlocalizable coherence patterns (such as thoughts and beliefs) nudge potential effects into existence (by an intention to heal in the person or practitioner), they are then seen by the body as locally acting, stable, "molecular" structures that produce specific biological signals and have predictable effects in the person. (Jonas and Jacobs 1996, 90)

This all sounds very much like Deepak Chopra (1989 and 1993), who asserts that: "Beliefs, thoughts, and emotions create the chemical reactions that uphold life in every cell." The notion that by thought alone the medicines needed to cure illness can be created within the body comes from Ayurveda, the traditional religious medicine of India that dates back thousands of years. Chopra has, in any case, created vast personal wealth by simply invoking "quantum healing" in book after book. His books reveal no hint that he has any concept of quantum mechanics.

Nevertheless, there are quantum mystics, including a few physicists, who interpret the wave function as some kind of vibration of a holistic ether that pervades the universe. Wave function collapse, they believe, happens throughout the universe instantaneously as a result of some cosmic consciousness. That, of course, would violate causality in the relativistic sense, and it would also violate quantum field theory (Eberhard and Ross 1989).

Biofield Therapeutics (Touch Therapy)

Alternative medicine consists of a wide spectrum of unrelated treatments ranging from the barely plausible to the totally preposterous. At the preposterous end, I place those therapies that have no direct physical consequences of any sort, such as homeopathy and psychic healing. One must also include "biofield therapeutics" or "touch therapy," though in fact it would be more accurate to call it "no-touch therapy," since the practitioner's hands do not actually make contact with the patient. Instead, it is claimed that the patient's "energy field," "*qi*," or "aura," is "smoothed" by the hands of the therapist or shifted from one place to another to achieve balance. The energy field is said to extend several inches outside the body, and the patient's field interacts with the field of the practitioner.

The nature of this supposed energy field is obscure, but proponents often link it in some way with relativity and the equivalence of matter and energy. It has also been suggested that the body's energy field is electromagnetic. Quantum mechanics, despite its popularity in many alternative medicine circles, rarely seems to be invoked in touch therapy. Indeed, B. Brennan, author of *Hands of Light* (1987), writes: "I am unable to explain these experiences without using the old classical physics framework." I confess that classical physics does not make it any easier for me to explain. Practitioners claim to be able to "feel" the energy field and often employ hand-held pendulums to locate the "chakras," or vortices, in the field that must be smoothed out to promote healing. It would seem to be a simple matter to examine a field that can be felt tactually, or that affects the motion of a pendulum, but so far no one has claimed to detect the energy field with any instrument that is not hand-held. This is quite remarkable since there are said to be tens of thousands in the United States who have been trained in some form of this therapy. In the United Kingdom there are 8,500 registered touch therapists (Benor 1993).

The public is spending billions of dollars annually on sugar pills to cure their sniffles, hand waving to speed recovery from operations, and good thoughts to ward off illness, all with assurances that it's based on science. Society has been set up for this fleecing in part by the media's sensationalized coverage of modern science. Popular discussions of relativity, quantum mechanics, and chaos often leave people with the impression that common sense cannot be relied on—anything is possible. Scientists themselves often feed the public's appetite for the "weirdness" of modern science in an effort to stimulate interest—or simply because scientists, too, can be beguiled by the mysterious.

References

Anagnostatos, G. S. 1994. In *Ultra High Dilution: Physiology and Physics*, edited by J. Schulte and P. C. Endler. Dordrecht: Kluwer.

Benor, D. J. *Frontier Perspectives* 3: 33.

Benveniste, J. 1993. *Frontier Perspectives* 3: 13.

Berezin, A. A. 1990. *Medical Hypothesis* 31: 43.

Brennan, B. 1987. *Hands of Light*. New York: Bantam.

Chopra, D. 1989. *Quantum Healing*. New York: Bantam.

———. 1993. *Ageless Body, Timeless Mind: The Quantum Alternative to Growing Old*. New York: Random House.

Davenas, E., et al. 1988. *Nature* 333: 816. The "Benveniste" paper.

Eberhard, P. H., and R. R. Ross. 1989. *Foundations of Physics Letters* 2: 127.

Endler, P. C., et al. 1994. *FASEB Journal* 8: 2313.

Foreman, J. C., et al. 1993. *Nature* 336: 525.

Jonas, W. B., and J. Jacobs. 1996. *Healing with Homeopathy*. Warner.

Maddox J. 1988. *Nature* 333: 287.

Rubik, B. 1990. *Berlin Journal of Research in Homeopathy* 1: 27.

Toumey, C. P. 1996. *Conjuring Science*. New Brunswick, N.J.: Rutgers. □

Why Bogus Therapies Seem to Work

At least ten kinds of errors and biases can convince intelligent, honest people that cures have been achieved when they have not.

BARRY L. BEYERSTEIN

Nothing is more dangerous than active ignorance.

—Goethe

Those who sell therapies of any kind have an obligation to prove, first, that their treatments are safe and, second, that they are effective. The latter is often the more difficult task because there are many subtle ways that honest and intelligent people (both patients and therapists) can be led to think that a treatment has cured someone when it has not. This is true whether we are assessing new treatments in scientific medicine, old nostrums in folk medicine, fringe treatments in "alternative medicine," or the frankly magical panaceas of faith healers.

To distinguish causal from fortuitous improvements that might follow any intervention, a set of objective procedures has evolved for testing putative remedies. Unless a technique,

ritual, drug, or surgical procedure can meet these requirements, it is ethically questionable to offer it to the public, especially if money is to change hands. Since most "alternative" therapies (i.e., ones not accepted by scientific biomedicine) fall into this category, one must ask why so many customers who would not purchase a toaster without consulting *Consumer Reports* shell out, with trusting naiveté, large sums for unproven, possibly dangerous, health remedies.

For many years, critics have been raising telling doubts about fringe medical practices, but the popularity of such nostrums seems undiminished. We must wonder why entrepreneurs' claims in this area should remain so refractory to contrary data. If an "alternative" or "complementary" therapy:

a. is implausible on *a priori* grounds (because its implied mechanisms or putative effects contradict well-established laws, principles, or empirical findings in physics, chemistry, or biology),
b. lacks a scientifically acceptable rationale of its own,
c. has insufficient supporting evidence derived from adequately controlled outcome research (i.e., double-blind, randomized, placebo-controlled clinical trials),
d. has failed in well-controlled clinical studies done by impartial evaluators and has been unable to rule out competing explanations for why it might *seem* to work in uncontrolled settings, and,
e. should seem improbable, even to the lay person, on "commonsense" grounds,

why would so many well-educated people continue to sell and purchase such a treatment?

The answer, I believe, lies in a combination of vigorous marketing of unsubstantiated claims by "alternative" healers (Beyerstein and Sampson 1996), the poor level of scientific knowledge in the public at large (Kiernan 1995), and the "will to believe" so prevalent among seekers attracted to the New Age movement (Basil 1988; Gross and Levitt 1994).

The appeal of nonscientific medicine is largely a holdover from popular "counterculture" sentiments of the 1960s and 1970s. Remnants of the rebellious, "back-to-nature" leanings of that era survive as nostalgic yearnings for a return to nineteenth-century-style democratized health care (now wrapped in the banner of patients' rights) and a dislike of bureaucratic, technologic, and specialized treatment of disease (Cassileth and Brown 1988). Likewise, the allure of the "holistic" dogmas of alternative medicine is a descendant of the fascination with Eastern mysticism that emerged in the sixties and seventies. Although the philosophy and the science that underlie these holistic teachings have been severely criticized (Brandon 1985), they retain a strong appeal for those committed to belief in "mind-over-matter" cures, a systemic rather than localized view of pathology, and the all-powerful ability of nutrition to restore health (conceived of as whole-body "balance").

Many dubious health products remain on the market primarily because satisfied customers offer testimonials to their worth. Essentially, they are saying, "I tried it and I got better, so it must be effective." But even when symptoms do improve following a treatment, this, by itself, cannot prove that the therapy was responsible.

The Illness-Disease Distinction

Although the terms *disease* and *illness* are often used interchangeably, for present purposes it is worth distinguishing between the two. I shall use *disease* to refer to a *pathological state* of the organism due to infection, tissue degeneration, trauma, toxic exposure, carcinogenesis, etc. By *illness* I mean the *feelings* of malaise, pain, disorientation, dysfunctionality, or other complaints that might accompany a disease. Our subjective reaction to the raw sensations we call symptoms is molded by cultural and psychological factors such as beliefs, suggestions, expectations, demand characteristics, self-serving biases, and self-deception. The experience of illness is also affected (often unconsciously) by a host of social and psychological payoffs that accrue to those admitted to the "sick role" by society's gatekeepers (i.e., health professionals). For certain individuals, the privileged status and benefits of the sick role are sufficient to perpetuate the experience of illness after a disease has healed, or even to create feelings of illness in the absence of disease (Alcock 1986).

Unless we can tease apart the many factors that contribute to the perception of being ill, personal testimonials offer no basis on which to judge whether a putative therapy has, in fact, cured a disease. That is why controlled clinical trials with objective physical measures are essential in evaluating therapies of any kind.

Correlation Does Not Imply Causation

Mistaking correlation for causation is the basis of most superstitious beliefs, including many in the area of alternative medicine. We have a tendency to assume that when things occur together, they must be causally connected, although obviously they need not be. For example, there is a high correlation between the consumption of diet soft drinks and obesity. Does this mean that artificial sweeteners cause people to become overweight? When we count on personal experience to test the worth of medical treatments, many factors are varying simultaneously, making it extremely difficult to determine what is cause and effect. Personal endorsements supply the bulk of the support for unorthodox health products, but they are a weak currency because of what Gilovich (1997) has called the "compared to what?" problem. Without comparison to a similar group of sufferers, treated identically except that the allegedly curative element is withheld, individual recipients can never know whether they would have recovered just as well without it.

Barry L. Beyerstein is at the Brain-Behavior Laboratory, Department of Psychology, Simon Fraser University, Burnaby, British Columbia, V5A 1S6 Canada.

Ten Errors and Biases

The question is, then: *Why might therapists and their clients who rely on anecdotal evidence and uncontrolled observations erroneously conclude that inert therapies work?* There are at least ten good reasons.

1. The disease may have run its natural course.

Many diseases are self-limiting—providing the condition is not chronic or fatal, the body's own recuperative processes usually restore the sufferer to health. Thus, before a therapy can be acknowledged as curative, its proponents must show that the number of patients listed as improved exceeds the proportion expected to recover without any treatment at all (or that they recover reliably faster than if left untreated). Unless an unconventional therapist releases detailed records of successes *and* failures over a sufficiently large number of patients with the same complaint, he or she cannot claim to have exceeded the published norms for unaided recovery.

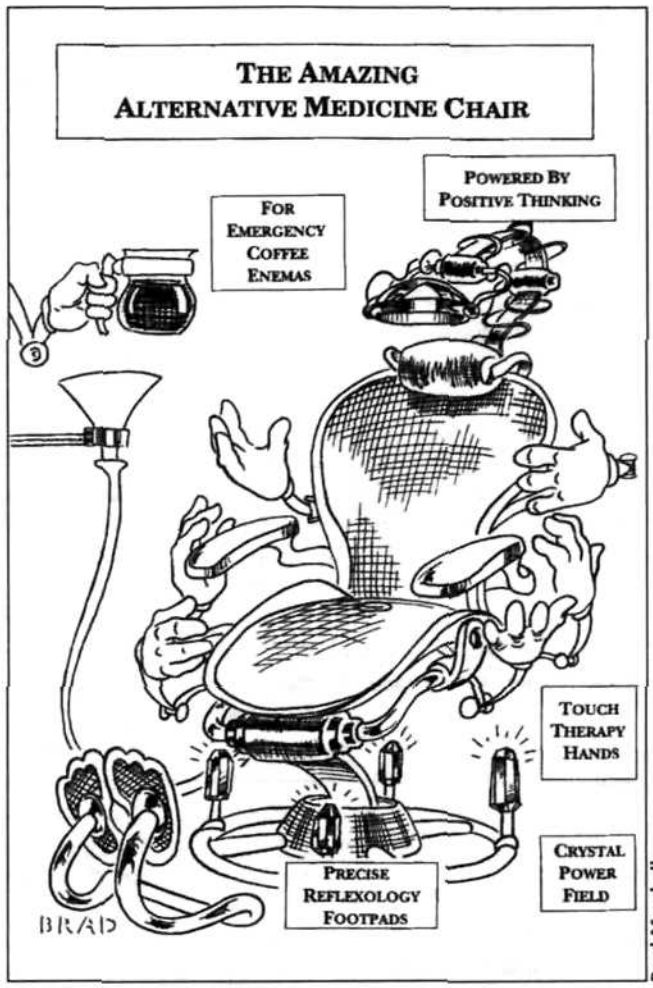
2. Many diseases are cyclical.

Arthritis, multiple sclerosis, allergies, and gastrointestinal complaints are examples of diseases that normally "have their ups and downs." Naturally, sufferers tend to seek therapy during the downturn of any given cycle. In this way, a bogus treatment will have repeated opportunities to coincide with upturns that would have happened anyway. Again, in the absence of appropriate control groups, consumers and vendors alike are prone to misinterpret improvement due to normal cyclical variation as a valid therapeutic effect.

3. Spontaneous remission.

Anecdotally reported cures can be due to rare but possible "spontaneous remissions." Even with cancers that are nearly always lethal, tumors occasionally disappear without further treatment. One experienced oncologist reports that he has seen twelve such events in about six thousand cases he has treated (Silverman 1987). Alternative therapies can receive unearned acclaim for remissions of this sort because many desperate patients turn to them when they feel that they have nothing left to lose. When the "alternatives" assert that they have snatched many hopeless individuals from death's door, they rarely reveal what percentage of their apparently terminal clientele such happy exceptions represent. What is needed is statistical evidence that their "cure rates" exceed the known spontaneous remission rate and the placebo response rate (see below) for the conditions they treat.

The exact mechanisms responsible for spontaneous remissions are not well understood, but much research is being devoted to revealing and possibly harnessing processes in the immune system or elsewhere that are responsible for these unexpected turnarounds. The relatively new field of psychoneuroimmunology studies how psychological variables affect the nervous, glandular, and immune systems in ways that might affect susceptibility to and recovery from disease (Ader and Cohen 1993; Mestel 1994). If thoughts, emotions, desires, beliefs, etc., are physical states of the brain, there is nothing inherently mystical in the notion that these neural processes could affect glandular, immune, and other cellular processes throughout the body. Via the limbic system of the brain, the hypothalamic pituitary axis, and the autonomic nervous system, psychological variables can have widespread physiological effects that can have positive or negative impacts upon health. While research has confirmed that such effects exist, it must be remembered that they are fairly small, accounting for perhaps a few percent of the variance in disease statistics.



Brad Marshall

4. The placebo effect.

A major reason why bogus remedies are credited with subjective, and occasionally objective, improvements is the ubiquitous placebo effect (Roberts, Kewman, and Hovell 1993; Ulett 1996). The history of medicine is strewn with examples of what, with hindsight, seem like crackpot procedures that were once enthusiastically endorsed by physicians and patients alike (Skrabanek and McCormick 1990; Barrett and Jarvis 1993). Misattributions of this sort arise from the false assumption that

a change in symptoms following a treatment must have been a specific consequence of that procedure. Through a combination of suggestion, belief, expectancy, cognitive reinterpretation, and diversion of attention, patients given biologically useless treatments can often experience measurable relief. Some placebo responses produce actual changes in the physical condition; others are subjective changes that make patients feel better although there has been no objective change in the underlying pathology.

Through repeated contact with valid therapeutic procedures, we all develop, much like Pavlov's dogs, conditioned responses in various physiological systems. Later, these responses can be triggered by the setting, rituals, paraphernalia, and verbal cues that signal the act of "being treated." Among other things, placebos can cause release of the body's own morphinelike pain killers, the endorphins (Ulett 1996, ch. 3). Because these learned responses can be palliative, even when a treatment itself is physiologically unrelated to the source of the complaint, putative therapies must be tested against a placebo control group—similar patients who receive a sham treatment that resembles the "real" one except that the suspected active ingredient is withheld.

It is essential that the patients in such tests be randomly assigned to their respective groups and that they be "blind" with respect to their active versus placebo status. Because the power of what psychologists call expectancy and compliance effects (see below) is so strong, the therapists must also be blind as to individual patients' group membership. Hence the term *double blind*—the gold standard of outcome research. Such precautions are required because barely perceptible cues, unintentionally conveyed by treatment providers who are not blinded, can bias test results. Likewise, those who assess the treatment's effects must also be blind, for there is a large literature on "experimenter bias" showing that honest and well-trained professionals can unconsciously "read in" the outcomes they expect when they attempt to assess complex phenomena (Rosenthal 1966; Chapman and Chapman 1967).

When the clinical trial is completed, the blinds can be broken to allow statistical comparison of active, placebo, and no-treatment groups. Only if the improvements observed in the active treatment group exceed those in the two control groups by a statistically significant amount can the therapy claim legitimacy.

5. Some allegedly cured symptoms are psychosomatic to begin with.

A constant difficulty in trying to measure therapeutic effectiveness is that many physical complaints can both arise from psychosocial distress and be alleviated by support and reassurance. At first glance, these symptoms (at various times called "psychosomatic," "hysterical," or "neurasthenic") resemble those of recognized medical syndromes (Shorter 1992; Merskey 1995). Although there are many "secondary gains" (psychological, social, and economic) that accrue to those who slip into "the sick role" in this way, we need not accuse them of conscious malingering to point out that their symptoms are nonetheless maintained by subtle psychosocial processes.

"Alternative" healers cater to these members of the "worried well" who are mistakenly convinced that they are ill. Their complaints are instances of somatization, the tendency to express psychological concerns in a language of symptoms like those of organic diseases (Alcock 1986; Shorter 1992). The "alternatives" offer comfort to these individuals who for psychological reasons need others to believe there are organic etiologies for their symptoms. Often with the aid of pseudoscientific diagnostic devices, fringe practitioners reinforce the somatizer's conviction that the cold-hearted, narrow-minded medical establishment, which can find nothing physically amiss, is both incompetent and unfair in refusing to acknowledge a very real organic condition. A large portion of those diagnosed with "chronic fatigue," "environmental sensitivity syndrome," and various stress disorders (not to mention many suing because of the allegedly harmful effects of silicone breast implants) look very much like classic somatizers (Stewart 1990; Huber 1991; Rosenbaum 1997).

When, through the role-governed rituals of "delivering treatment," fringe therapists supply the reassurance, sense of belonging, and existential support their clients seek, this is obviously worthwhile, but all this need not be foreign to scientific practitioners who have much more to offer besides. The downside is that catering to the desire for medical diagnoses for psychological complaints promotes pseudoscientific and magical thinking while unduly inflating the success rates of medical quacks. Saddest of all, it perpetuates the anachronistic feeling that there is something shameful or illegitimate about psychological problems.

6. Symptomatic relief versus cure.

Short of an outright cure, alleviating pain and discomfort is what sick people value most. Many allegedly curative treatments offered by alternative practitioners, while unable to affect the disease process itself, do make the illness more bearable, but for psychological reasons. Pain is one example. Much research shows that pain is partly a sensation like seeing or hearing and partly an emotion (Melzack 1973). It has been found repeatedly that successfully reducing the emotional component of pain leaves the sensory portion surprisingly tolerable. Thus, suffering can often be reduced by psychological means, even if the underlying pathology is untouched. Anything that can allay anxiety, redirect attention, reduce arousal, foster a sense of control, or lead to cognitive reinterpretation of symptoms can alleviate the agony component of pain. Modern pain clinics put these strategies to good use every day (Smith, Merskey, and Gross 1980). Whenever patients suffer less, this is all to the good, but we must be careful that purely symptomatic relief does not divert people from proven remedies until it is too late for them to be effective.

7. Many consumers of alternative therapies hedge their bets.

In an attempt to appeal to a wider clientele, many unorthodox healers have begun to refer to themselves as "complementary" rather than "alternative." Instead of ministering primarily to the ideologically committed or those who have been told there is nothing more that conventional medicine can do for them, the "alternatives" have begun to advertise that they can enhance conventional biomedical treatments. They accept that orthodox practitioners can alleviate specific symptoms but contend that alternative medicine treats the *real* causes of disease—dubious dietary imbalances or environmental sensitivities, disrupted energy fields, or even unresolved conflicts from previous incarnations. If improvement follows the combined delivery of "complementary" and scientifically based treatments, the fringe practice often gets a disproportionate share of the credit.

8. Misdiagnosis (by self or by a physician).

In this era of media obsession with health, many people can be induced to think they have diseases they do not have. When these healthy folk receive the oddly unwelcome news from orthodox physicians that they have no organic signs of disease, they often gravitate to alternative practitioners who can almost always find some kind of "imbalance" to treat. If "recovery" follows, another convert is born.

Of course, scientifically trained physicians are not infallible, and a mistaken diagnosis, followed by a trip to a shrine or an alternative healer, can lead to a glowing testimonial for curing a grave condition that never existed. Other times, the diagnosis may be correct but the time course, which is inherently hard to predict, might prove inaccurate. If a patient with a terminal condition undergoes alternative treatments and succumbs later than the conventional doctor predicted, the alternative procedure may receive credit for prolonging life when, in fact, there was merely an unduly pessimistic prognosis—survival was longer than the expected norm, but within the range of normal statistical variation for the disease.

9. Derivative benefits.

Alternative healers often have forceful, charismatic personalities (O'Connor 1987). To the extent that patients are swept up by the messianic aspects of alternative medicine, psychological uplift may ensue. If an enthusiastic, upbeat healer manages to elevate the patient's mood and expectations, this optimism can lead to greater compliance with, and hence effectiveness of, any orthodox treatments he or she may also be receiving. This expectant attitude can also motivate people to eat and sleep better and to exercise and socialize more. These, by themselves, could help speed natural recovery.

Psychological spinoffs of this sort can also reduce stress, which has been shown to have deleterious effects on the immune system (Mestel 1994). Removing this added burden may speed healing, even if it is not a specific effect of the therapy. As with purely symptomatic relief, this is far from a bad thing, unless it diverts the patient from more effective treatments, or the charges are exorbitant.

10. Psychological distortion of reality.

Distortion of reality in the service of strong belief is a common occurrence (Alcock 1995). Even when they derive no objective improvements, devotees who have a strong psychological investment in alternative medicine can convince themselves they have been helped. According to *cognitive dissonance* theory (Festinger 1957), when experiences contradict existing attitudes, feelings, or knowledge, mental distress is produced. We tend to alleviate this discord by reinterpreting (distorting) the offending information. To have received no relief after committing time, money, and "face" to an alternate course of treatment (and perhaps to the worldview of which it is a part) would create such a state of internal disharmony. Because it would be too psychologically disconcerting to admit to oneself or to others that it has all been a waste, there would be strong psychological pressure to find some redeeming value in the treatment.

Many other *self-serving biases* help maintain self-esteem and smooth social functioning (Beyerstein and Hadaway 1991). Because core beliefs tend to be vigorously defended by warping perception and memory, fringe practitioners and their clients are prone to misinterpret cues and remember things as they wish they had happened. Similarly, they may be selective in what they recall, overestimating their apparent successes while ignoring, downplaying, or explaining away their failures. The scientific method evolved in large part to reduce the impact of this human penchant for jumping to congenial conclusions.

An illusory feeling that one's symptoms have improved could also be due to a number of so called *demand characteristics* found in any therapeutic setting. In all societies, there exists the "norm of reciprocity," an implicit rule that obliges people to respond in kind when someone does them a good turn. Therapists, for the most part, sincerely believe they are helping their patients and it is only natural that patients would want to please them in return. Without patients necessarily realizing it, such obligations are sufficient to inflate their perception of how much benefit they have received. Thus, controls for compliance effects must also be built into proper clinical trials (Adair 1973).

Finally, the job of distinguishing real from spurious causal relationships requires not only controlled observations, but also systematized abstractions from large bodies of data. Psychologists interested in *judgmental biases* have identified many sources of error that plague people who rely on informal reasoning processes to analyze complex events (Gilovich 1991, 1997; Schick and Vaughn 1995). Dean and colleagues (1992) showed, using examples from another popular pseudoscience, handwriting analysis, that without sophisticated statistical aids, human cognitive abilities are simply not up to the task of sifting

valid relationships out of masses of interacting data. Similar difficulties would have confronted the pioneers of pre-scientific medicine and their followers, and for that reason, we cannot accept their anecdotal reports as support for their assertions.

Summary

For the reasons I have presented, individual testimonials count for very little in evaluating therapies. Because so many false leads can convince intelligent, honest people that cures have been achieved when they have not, it is essential that any putative treatment be tested under conditions that control for placebo responses, compliance effects, and judgmental errors.

Before anyone agrees to undergo any kind of treatment, he or she should be confident that it has been validated in properly controlled clinical trials. To reduce the probability that supporting evidence has been contaminated by the foregoing biases and errors, consumers should insist that supporting evidence be published in peer-reviewed scientific journals. Any practitioner who cannot supply this kind of backing for his or her procedures is immediately suspect. Potential clients should be wary if, instead, the "evidence" consists merely of testimonials, self-published pamphlets or books, or items from the popular media. Even if supporting articles appear to have come from legitimate scientific periodicals, consumers should check to see that the journals in question are published by reputable scientific organizations. Papers extolling pseudoscience often appear in official-looking periodicals that turn out to be owned by groups with inadequate scientific credentials but with a financial stake in the questionable products. Similarly, one should discount articles from the "vanity press"—journals that accept virtually all submissions and charge the authors for publication. And finally, because any single positive outcome—even from a carefully done experiment published in a reputable journal—could always be a fluke, replication by independent research groups is the ultimate standard of proof.

If the practitioner claims persecution, is ignorant of or openly hostile to mainstream science, cannot supply a reasonable scientific rationale for his or her methods, and promises results that go well beyond those claimed by orthodox biomedicine, there is strong reason to suspect that one is dealing with a quack. Appeals to other ways of knowing or mysterious sounding "planes," "energies," "forces," or "vibrations" are other telltale signs, as is any claim to treat the whole person rather than localized pathology.

To people who are unwell, any promise of a cure is especially beguiling. As a result, false hope easily supplants common sense. In this vulnerable state, the need for hard-nosed appraisal is all the more necessary, but so often we see instead an eagerness to abandon any remaining vestiges of skepticism. Erstwhile savvy consumers, felled by disease, often insist upon less evidence to support the claims of alternative healers than they would previously have demanded from someone hawking a used car. Caveat emptor!

References

Adair, J. 1973. *The Human Subject.* Boston: Little, Brown and Co.

Ader, R., and N. Cohen. 1993. Psychoneuroimmunology: Conditioning and stress. *Annual Review of Psychology* 44: 53–85.

Alcock, J. 1986. Chronic pain and the injured worker. *Canadian Psychology* 27(2): 196–203.

———. 1995. The belief engine. SKEPTICAL INQUIRER 19(3): 14–8.

Barrett, S., and W. Jarvis. 1993. *The Health Robbers: A Close Look at Quackery in America.* Amherst, N.Y.: Prometheus Books.

Basil, R., ed. 1988. *Not Necessarily the New Age.* Amherst, N.Y.: Prometheus Books.

Beyerstein, B., and P. Hadaway. 1991. On avoiding folly. *Journal of Drug Issues* 20(4): 689–700.

Beyerstein, B., and W. Sampson. 1996. Traditional medicine and pseudoscience in China. SKEPTICAL INQUIRER 20(4): 18–26.

Brandon, R. 1985. Holism in philosophy of biology. In *Examining Holistic Medicine,* edited by D. Stalker and C. Glymour. Amherst, N.Y.: Prometheus Books, 127–36.

Cassileth, B., and H. Brown. 1988. Unorthodox cancer medicine. *CA-A Cancer Journal for Clinicians* 38(3): 176–86.

Chapman, L., and J. Chapman. 1967. Genesis of popular but erroneous diagnostic observations. *Journal of Abnormal Psychology* 72: 193–204.

Dean, G., I. Kelly, D. Saklofske, and A. Furnham. 1992. Graphology and human judgement. In *The Write Stuff,* edited by B. and D. Beyerstein. Amherst, N.Y.: Prometheus Books, 342–96.

Festinger, L. 1957. *A Theory of Cognitive Dissonance.* Stanford: Stanford University Press.

Gilovich, T. 1991. *How We Know What Isn't So: The Fallibility of Human Reason in Everyday Life.* New York: Free Press/Macmillan.

———. 1997. Some systematic biases of everyday judgment. SKEPTICAL INQUIRER 21(2): 31–5.

Gross, P., and N. Levitt. 1994. *Higher Superstition.* Baltimore: Johns Hopkins University Press.

Huber, P. 1991. *Galileo's Revenge: Junk Science in the Courtroom.* New York: Basic Books.

Kiernan, V. 1995. Survey plumbs the depths of international ignorance. *The New Scientist* (April 29): 7.

Merskey, H. 1995. *The Analysis of Hysteria: Understanding Conversion and Dissociation.* 2d ed. London: Royal College of Psychiatrists.

Melzack, R. 1973. *The Puzzle of Pain.* New York: Basic Books.

Mestel, R. 1994. Let mind talk unto body. *The New Scientist* (July 23): 26–31.

O'Connor, G. 1987. Confidence trick. *The Medical Journal of Australia* 147: 456–9.

Roberts, A., D. Kewman, and L. Hovell. 1993. The power of nonspecific effects in healing: Implications for psychosocial and biological treatments. *Clinical Psychology Review* 13: 375–91.

Rosenbaum, J. T. 1997. Lessons from litigation over silicone breast implants: A call for activism by scientists. *Science* 276 (June 6, 1997): 1524–5.

Rosenthal, R. 1966. *Experimenter Effects in Behavioral Research.* New York: Appleton-Century-Crofts.

Schick, T., and L. Vaughn. 1995. *How to Think About Weird Things: Critical Thinking for a New Age.* Mountain View, Calif.: Mayfield Publishing.

Shorter, E. 1992. *From Paralysis to Fatigue: A History of Psychosomatic Illness in the Modern Era.* New York: The Free Press.

Silverman, S. 1987. Medical "miracles": Still mysterious despite claims of believers. *Psientific American* (July): 5–7. Newsletter of the Sacramento Skeptics Society, Sacramento, Calif.

Skrabanek, P., and J. McCormick. 1990. *Follies and Fallacies in Medicine.* Amherst, N.Y.: Prometheus Books.

Smith, W., H. Merskey, and S. Gross, eds. 1980. *Pain: Meaning and Management.* New York: SP Medical and Scientific Books.

Stalker, D., and C. Glymour, eds. 1985. *Examining Holistic Medicine.* Amherst, N.Y.: Prometheus Books.

Stewart, D. 1990. Emotional disorders misdiagnosed as physical illness: Environmental hypersensitivity, candidiasis hypersensitivity, and chronic fatigue syndrome. *Int. J. Mental Health* 19(3): 56–68.

Ulett, G. A. 1996. *Alternative Medicine or Magical Healing.* St. Louis: Warren H. Green. □

Inconsistencies and Errors in Alternative Medicine Research

Faulty research purporting to show the effectiveness of 'alternative' therapies is making its way into the literature, while studies showing negative results for these therapies go unpublished.

WALLACE SAMPSON

Attempting to obtain scientific legitimacy, a number of "alternative" medicine proponents have published studies purporting to show that their therapies have significant effects. On examination, many of these studies have defects that cast doubt on their conclusions. In addition, numerous reports showing negative results for the therapies go unnoticed by the popular press. Here are brief examinations of some questionable studies in three areas of alternative medicine.

Homeopathy

The famous and now defunct study from the Paris laboratory of Jacques Benveniste (Davenas et al. 1988) purported

to show that homeopathic dilutions of a substance had as much effect as more concentrated solutions. The system used was the microscopic appearance of basophils (a type of white blood cell) before and after exposure to an antibody that causes the cells to release histamine from blue-staining granules. The antibody and histamine are the chemical mediators of hay fever and asthma. On exposure to the antibody, the basophils release histamine and the granules fade and disappear. The degree of degranulation was recorded for each dilution. At the highest dilutions (10^{-120}) the likelihood of a single molecule of antibody remaining is less than 10^{-96}. All readings were done by eye, with no machine or objective recording.

Clinical studies of homeopathy are suspect because of post-hoc data analysis, selected reporting of end points, inappropriate analysis of aggregated data, and unexplained conflicting results.

However, with progressive dilutions there were peaks of effect and valleys of no effect. The range of effects was from 0 percent to 60 to 80 percent loss of granules. The authors stated that with successive runs, the peaks and troughs of activity could vary by as much as two dilutions either way. The waves also varied with different samples.

Measuring the distance between peaks and troughs, we found: 1) The peak value of one run could become the trough value of the next. In other words, one could not predict which dilution would have an effect and which would have no effect. In clinical application, therefore, a homeopath could not predict which dilution would be effective with the first dose, or whether it would be effective or not the next time it was administered. 2) The peak values of the 10^{-120} dilution equalled those of the most concentrated solution (10^{-3}); so if the homeopathic preparation "worked," it would be more likely to reproduce or worsen symptoms of the disease than cause improvement. These results could not be reproduced under the observation of an investigating team (Maddox, Randi, and Stewart 1988) or by at least two other laboratories. The experiment's conclusions were not only invalid; the results actually proved the opposite of the claims.

Another experiment (Reilly et al. 1986) showed several peculiarities. A placebo and a homeopathic treatment were compared on patients with hay fever. Curves of the daily symptom scores for the first seventeen days of treatment showed no difference between the treatment and placebo groups. Only at weeks four and five did the two groups differ significantly. The authors reported success because of the differences at the later weeks. If the difference had instead been at week one and two, would success have also been claimed?

They analyzed the data in four different ways: daily symptom scores, changes in symptom scores, scores adjusted for daily pollen counts, and separate analysis of patients whose hay fever was aggravated. When the authors found the homeopathy group worsened during early treatment when analyzed by pollen-count adjustment, the authors explained it thus: "Aggravation of symptoms is a well-known initial response to a homeopathic stimulus." In other words, when the treatment patients do better than controls, homeopathy is successful. When the controls do better, there is a ready, ad hoc explanation for it. (Heads we win, tails we win.)

Effects fluctuated widely. Comparing the Reilly study to ten studies in allergy and immunology journals, we find that the other studies showed more regular trends in both treatment and control groups. The fluctuations in the Reilly study render the data suspiciously unreliable, because the authors could select the positive relationships found and dismiss the negative ones.

Although there was a statistically significant overall difference between the treatment and control groups, caused mainly by the large numbers in the study, the spread of responses and worsening was very broad, making predictability for any one patient quite uncertain. The likelihood of improvement was only slightly better than the likelihood of worsening. The clinical significance, if any, was minor.

The authors' subsequent studies of asthma and hay fever (Reilly et al. 1994) used smaller numbers of patients, measuring most symptoms again. For most of the study period there was no significant difference between the groups, whereas in the earlier study, the groups differed at four to five weeks. This was unaccounted for. Such minimal results when applied to large numbers of patients are in contrast to the testimonials of homeopathy patients who often claim immediate and dramatic results after standard therapy fails. Only one of three objective measures of pulmonary function showed a significant difference between treatment and control groups ($P = 0.03$.).

Another study (Jacobs et al. 1994) proposed to show that homeopathic preparations shortened the course of childhood diarrhea. The study, performed in Nicaragua, depended on observations by relatives of the children in the study (i.e., surrogate observers). They reported on such traits as irritability or somnolence, the appearance and smell of the feces, and other qualitative indicators. Their observations, of course, depended on their memories and observing capabilities. Counts of numbers of bowel movements were subject to error (e.g., how many bowel movements occur during sleep to dirty one diaper?). In addition, the remedy selected depended on the symptoms in the preceding twelve to twenty-four hours. Had the information been collected six hours later, the remedy might have been different, yet the selected remedy was given for sev-

Wallace Sampson, M.D., is former Chief of Medical Oncology at Santa Clara Valley Medical Center, San Jose, and Clinical Professor of Medicine at Stanford University, where he teaches the analysis of "alternative" and aberrant medical claims.

eral days. Controls for each selected remedy were not balanced.

Of five or more end points (measures of effectiveness), only one—the number of days before two stools were formed within a twenty-four hour period—showed a significance below the P = 0.05 level. The difference between the treatment and control groups was less than one day, and less than one stool per day (three for controls vs. two for treatment.) This difference was clinically insignificant. There was no difference between control and treatment groups during the first twenty-four hours, when differences would have been clinically significant. The small difference likely represented normal variation found in any single study. We could obtain no proof that the end point of this study was established beforehand, so selection after the fact was possible. A number of mathematical errors appeared in the data tables. An intriguing major difference between control and treatment groups was between children who had pathogens in their stool and those who did not, raising the question of whether or not some anti-infective material had been introduced. The difference went unexplained.

Of two meta-analyses on homeopathy (Kleijnen et al. 1991; Hill and Doyon 1990), one found poor evidence for effect, and the other found that a majority of studies showed some effect, though small. They also found that the studies were uniformly of poor quality (Reilly et al. 1986 was one of the best rated).

Although homeopathic authors attribute "effects" to the imprinting of initial material on water molecules ("memory" of the initial material), the tablets on which the water is placed are usually dry—the water having evaporated. (The Reilly study material might have contained water, but no proof was offered.) *One recalls the Cheshire cat, which disappeared,* leaving only its smile.

Group Therapy for Cancer

A study of the effectiveness of therapy support groups for cancer patients, begun in the late 1970s at Stanford University, was published ten years later (Spiegel et al. 1989). According to the authors of the study, the data show that group participants "lived on average twice as long as controls." The study's initial objectives did not include survival. Thus, the study was functionally retrospective, with the usual limitations of looking back: 1) one's chances of finding positive and negative correlations are increased when the end-point measure is not specified at the outset, and 2) chances for unintentional biases occur when the initial random assignment of subjects to their respective groups is not clearly appropriate for the outcome measure.

The study's control group contained fewer patients than the treatment group (thirty-four to fifty at the beginning, twenty-four to thirty-four at completion of therapy groups.) This is the inverse of usual study technique, which calls for equal numbers in each group or an excess in the control group. Nevertheless, statistical analysis found a significant difference between the treatment and the control groups' survival rates, but the numbers were also fairly small, thus allowing for the possibility of a few outliers and/or a faulty assignment procedure to alter the outcome.

The study states that the treatment group lived on average twice as long as the control group. This is misleading. Examination of the survival graph suggests a nonrandom assignment of patients. The difference between the two groups was due to only fourteen of the original fifty of the treatment group, and only eight who lived more than six years. The survival of the two groups was about equal until fifty months (four years) into the study and three years after the therapy groups ended. Such curves are unusual. Typical cancer survival curves show significant differences starting earlier, often within one year. Also, more patients in the treatment group died within the first six to twelve months than did patients in the control group, further suggesting an uneven initial patient assignment. A form of natural selection could have operated as the patient pool was replaced with new patients prior to beginning the group therapy.

Many studies of effects of psychological factors on cancer survival are mixed, with several showing negative results. Why these negative studies are not more well known testifies to what makes "news."

Examination of the patients' original stages, the time to first metastasis, and other predictive criteria failed to reveal a significant difference between the two groups, but the survival *curves show that all of the control patients died within four* years of beginning group therapy (average of five to six years after metastasis discovery.) There were three long-term survivors in the treatment group (over eight years.) Three other sources—a study of the natural history of breast cancer (Rosen et al. 1989), the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) national data, and northern California data (Northern California Tumor Registry, Dist. I)—all show a ten to fifteen percent ten-year survival rate for breast-cancer patients after the discovery of metastatic spread. The treatment patients from the Stanford study show the same survival as these large surveys. The control group was aberrant.

This same odd result occurred in a prospective study from UCLA (Fawzy et al. 1993). In this study, Stage I melanoma patients received either therapy support or normal follow-up. Therapy patients lived the same length of time as patients summarized from SEER national data (93 percent alive in five years from the date of discovery of metastasis). The controls did worse than national data for the same disease and stage (74

percent alive at six years). Again, the population of this study seemed to be different from national norms, or the control group was aberrant.

It is difficult to establish why the same aberrant distribution occurred in both the Stanford and the UCLA studies, since the authors maintain that the studies were randomized appropriately, but one must consider the results with skepticism. Many studies of effects of psychological factors on cancer survival are mixed, with several showing negative results (Bagenal et al. 1990; Jamison et al. 1987; Gellert et al. 1993). Why these negative studies are not more well known testifies to what makes "news."

Acupuncture for Drug and Alcohol Withdrawal

Acupuncture has become popular among judges and court officials as a means to prevent recidivism in drug and alcohol maintenance programs. Many major cities have instituted such programs. The major reference work (Bullock et al. 1989) showed that alcoholics in a maintenance program supplemented by "genuine" or "real" ear acupuncture had a lower rate of recidivism than those who received "sham" acupuncture (needles placed about 5 mm away from the designated point.) It was described as a blinded study.

However, the acupuncturists, who knew which individuals received the "real" and which received the "sham" acupuncture, were allowed to socialize with the subjects; "real" and "sham" subjects were allowed to mingle freely with one another; and "real" and "sham" subjects were treated in adjacent chairs. Those familiar with principles of nonverbal communication and suggestion will recognize this study as not being adequately blinded. The dropout rate from the program for the "sham" group was over 90 percent. Although compliance rate in the "real" group indicated acupuncture's effectiveness, the difference was probably because the "sham" group recognized that they were the controls. This same problem plagued AIDS researchers whose subjects could easily tell if they were in treatment (AZT) or control groups (Cooke 1990). A meta-analysis of acupuncture for drug maintenance programs showed that acupuncture works no better than other methods (ter Riet et al. 1991).

Two meta-analyses of acupuncture for pain relief indicate that the best-controlled studies show no difference in effectiveness between genuine acupuncture and control or sham procedures, whereas the worst-controlled studies show the greatest effectiveness (ter Riet et al. 1989; Sampson 1991). Acupuncture acts on pain probably through a combination of counterirritation and misdirection of pain, consensual expectation, and classical conditioning and reinforcement. Other factors that play a role may be political belief, disaffection, and economic interest. Endorphin secretion may add to the temporary euphoria for conditioning, but probably has little to do with overall success. The needles themselves are not necessary for pain relief.

Concluding Remarks

Some of these problems are more serious than others. The Benveniste study was invalid. Clinical studies of homeopathy are suspect because of post-hoc data analysis, selected reporting of end points, inappropriate analysis of aggregated data, and unexplained conflicting results. The differences between homeopathy and placebos are so small that they are best explained as normal variations seen in studies. The selected end-point reporting, inconsistency of results, and conflicting reports coupled with homeopathy's improbable action call for extreme skepticism of the claims.

The problems with the papers on cancer group therapy are more obscure, but aberrant control groups make alternate explanations more likely, especially since effects on cancer are minimal or negative. As for the papers on acupuncture and drug and alcohol recidivism, inconsistencies and the negative meta-analyses on analgesia all but invalidate acupuncture except as a conditioning tool in altering behavior.

Taken individually, the studies are weak, and one wonders how some papers were accepted for publication. Taken together, the reports demonstrate small differences in results, undefined end points, data misinterpretation, and inconsistency with scientific evidence already in existence.

References

Bagenal, F. S., et al. 1990. Survival of patients with breast cancer attending Bristol Cancer Self-Help Center. *Lancet* 336: 606–10.

Bullock, M., et al. 1989. Controlled trial of acupuncture for severe recidivist alcoholism. *Lancet* 334: 1435–9.

Cooke, M. 1990. Personal communication.

Davenas, E., et al. 1988. Human basophil degranulation triggered by very dilute antiserum against IgE. *Nature* 333: 816–8. [The "Benveniste" paper. Benveniste is thirteenth and last author listed but is the one "to whom correspondence should be addressed."]

Fawzy, F., et al. 1993. Malignant melanoma effects of an early structured psychiatric intervention, 6 years later. *Arch Gen Psych* 50: 681–9.

Gellert, J., et al. 1993. Survival of breast cancer patients receiving adjuctive psychosocial support therapy. *J Clin Oncol* 11: 66–9.

Hill, C., and F. Doyon. 1990. Review of randomized trials of homeopathy. *Rev Epidem of Santé Publ* 38: 139–47.

Jacobs, J., et al. 1994. Treatment of acute childhood diarrhea with homeopathy. *Pediatrics* 93: 719–23.

Jamison, R. N., et al. 1987. Psychogenic factors in predicting survival of breast cancer patients. *J Clin Oncol* 5: 768–72.

Kleijnen, J. et al. 1991. Clinical trials of homeopathy. *Brit Med J* 302: 316–23.

Maddox, J., J. Randi, and W. W. Stewart. 1988. 'High-dilution' experiments a delusion. *Nature* 334: 287–90.

National Cancer Institute. 1992. Survival, surveillance, and end results (SEER) in cancer. Table VI-2.

Northern California Tumor Registry, Dist I.

Reilly, D., et al. 1986. Is homeopathy a placebo response? *Lancet* (ii): 881–5.

———. 1994. Is evidence for homeopathy reproducible? *Lancet* 344: 1601–4.

Rosen, P. P., et al. 1989. Examination of the natural history of breast cancer. *J Clin Oncol* 11: 66–9.

Sampson, W. 1991. Position paper on acupuncture. *Clin J Pain*: 39–42.

Spiegel D., et al. 1989. Effect of psychosocial treatment on survival of patients with metastatic breast cancer. *Lancet:* 888–91.

ter Riet, et al. 1989. Acupuncture for pain: A meta-analysis. *Br J Gen Pract.*

———. 1991. *Br Med J.*

□

Pseudoscience in Alternative Medicine

Many alternative treatments are said to work because they are based on science, and consumers who are not scientifically literate believe this. A critical review of the publications of alternative medical proponents in three selected areas—chelation therapy, antineoplastons, and coffee enemas—quickly exposes the fiction.

SAUL GREEN

I left the Sloan Kettering Institute in New York in 1981, after twenty-seven years of basic cancer research experience. I wanted to use that experience, so I decided to search around for an alternative treatment that made scientific sense and volunteer to help find evidence to justify its medical worth.

My education in alternative medicine began when I joined patient ombudsman Grace Powers Monaco's Candlelighters Childhood Cancer Foundation. This organization provides counsel to families on issues of informed consent for both established and alternative medical treatments. My job was to evaluate the science of the alternative treatments patients were asking about.

My studies led me to the following observations. Advertis-

ing, not science, is the lifeblood of these treatments. Alternative treatment practitioners attempt to impress potential patients by constructing bibliographies that cite everything they have ever written. Few are peer-reviewed research papers, and the journals are not in U.S. medical libraries. I learned that reporters have the naive notion that if they tell some of both sides of a story, their readers will know who was lying.

Alternative medicine practitioners must advertise to flourish. Thus, every request I made for published material resulted in a flood of mail from quacks all over the country. I received reprints of articles from pornography magazines, books, family magazines, supermarket tabloids, health-food-store handouts, clinic brochures, and pseudoscientific papers. Every mailing contained a request for money to aid in the fight against the Establishment or for a membership in a "club" that sells all-natural, totally safe lotions, motions, and potions to ensure youth, health, and irresistible sexual prowess.

It soon became obvious that getting our findings to medical consumers would be a problem. The National Cancer Institute (NCI) was aware of this, and in 1986 it requested grant applications to produce critical reviews of the claims of alternative treatments. As we had already collected a good deal of information about alternative medical treatments, we applied for and were awarded a grant in June 1988 (SBIR-R44, CA-4195302). Each review we did was peer-reviewed by experts in the field, and when the entire set was complete, we donated it to the NCI to be incorporated in their database (PDQ).

Practitioners attempt to impress potential patients by constructing bibliographies that cite everything they have ever written. Few are peer-reviewed research papers, and the journals are not in U.S. medical libraries.

The Chief of the Investigational Drug Branch, Cancer Therapy Evaluation Program, NCI, Dr. Michael Hawkins, responded. He thanked us for sending the database but said they could not accept it because they could not afford the expense of having it peer-reviewed, keeping it up to date, and appending it with "new" alternative treatments. This rejection of our gift came as a shock. After all, the NCI had paid us to do the work, we knew the existing PDQ had no information on alternative medicine, our monographs were already peer-reviewed, the alternative treatments we reviewed had not changed in decades, and no new ones were forthcoming. As a result of NCI's decision, our database now reposes, unused, in the archives of the American Cancer Society.

As scientific director of our group, I had all the files on each treatment. Since the database was not to be made available to the public, I decided to publish the results and conclusions I reached after reviewing each of some thirty treatments.

The following are abstracts of three of those reviews. They are on chelation therapy (Green 1993), antineoplastons (Green 1992a), and the Gerson diet and coffee enemas (Green 1992b).

Chelation Therapy

Chelation therapy is the intravenous infusion of ethylenediamine tetraacetic acid (EDTA), a synthetic amino acid. This water-soluble chemical can bind free metal ions in the blood circulation and carry them out of the body in the urine. Iron is bound most strongly and calcium most weakly. All the metal ions in the circulation that are bound more strongly than calcium are removed before calcium (Chenowith 1961).

Chelation therapy with EDTA is accepted by patients as an effective alternative to established medical interventions for atherosclerosis, coronary artery disease, and occlusive peripheral vascular disease. Essentially all of the claims made by chelation therapists are found in four how-to books (Walker and Gordon 1982; Trowbridge and Gordon 1985; Cranton 1989; Cranton and Brecher 1990). The jargon in these books creates the impression that chelation therapy is sound science.

Chelation therapists claim they have given millions of EDTA treatments and benefited hundreds of thousands of patients (Cranton 1989). They say the EDTA treatments work in one of two ways: 1) EDTA circulating in the blood chelates (binds) the calcium found in plaque (fatty deposits) on arterial walls. This destroys the structural integrity of the plaque, and it disintegrates (Walker and Gordon 1982). 2) Plaque is caused by injury to the arterial walls by free radicals generated by ionic iron. Chelating the iron with EDTA prevents free-radical formation and damage to artery walls (Cranton and Brecher 1990).

Rebuttal: Neither of these mechanisms is valid. Plaque results from the accumulation of new cells at the site of the repair of repeated arterial wall injuries. EDTA is water-soluble so it does not enter the lipid-rich arterial cell membranes to chelate the calcium. The calcium in plaque is not part of the plaque structure; it is a contaminant brought in late in the course of artery-wall healing. It has been experimentally proven that removing calcium from plaque does not cause the plaque to disintegrate (Wilder et al. 1962; Stemmerman 1978).

That chelation of iron with EDTA will stop the generation of free radicals is untrue. In 1956, researchers discovered that when ionic iron was chelated with EDTA, its ability to generate powerful oxidizing radicals was *increased* tenfold (Green 1956). They also found that vitamin C causes a release of iron from tissues. Chelation therapists sometimes add vitamin C to the EDTA infusion mixture, and by doing so they are making more iron available to the body for free-radical formation.

These facts, along with the absence of objective evidence of clinical efficacy, prove that chelation with EDTA cannot be effective in treating coronary artery disease by the mechanisms described.

Antineoplastons

Unlike other alternative medical practitioners, Stanislaw R. Burzynski has published volumes of material. This impresses

patients, but unless they understand what they are reading, they cannot know what is implied. To a scientist, Burzynski's literature paints a clear picture of the quality of the evidence he offers in support of his theory.

Burzynski received an M.D. from a medical academy in Poland in 1967 and a D.Msc. in 1968. He did not finish a residency or train in oncology, and his bibliography does not mention clinical cancer research, urine, or antineoplastons during this period. Burzynski came to the United States in 1970 and worked in the department of anesthesiology at Baylor University, Houston, for three years, isolating peptides from rat brains. He got a license to practice medicine in 1973 and, with others, received a three-year grant to study the effect of urinary peptides on the growth of cancer cells in tissue culture. The grant was not renewed.

In 1976, with no preclinical or clinical cancer research experience, Burzynski announced a theory for the cure of cancer based on his assumption that spontaneous regression occurs because natural anticancer peptides, which he named *antineoplastons*, "normalize" cancer cells. Since urine contains lots of peptides, he concluded that there he would find antineoplastons. Less than one year later and based only on these assumptions, Burzynski used an extract from human urine (antineoplaston A) to treat twenty-one cancer patients at a clinic he opened. His shingle read, "Stanislaw R. Burzynski, M.D., *Ph.D.*"

By 1985, Burzynski had eight antineoplastons with which he was treating cancer patients. The first five were fractions from human urine. These he called A-1 through A-5. From A-2 he made A-10, which was *insoluble* 3-N-phenylacetlyamino piperidine 2,6-dione. He said A-10 was the anticancer peptide common to all his urine fractions. He then treated the insoluble A-10 with alkali, which yielded a soluble product he named AS-2.5. Further treatment of AS-2.5 with alkali yielded a product he called AS-2.1. Burzynski is currently treating patients with AS-2.1 and what he *calls* A-10.

Rebuttal: Burzynski's claim to a Ph.D. is questionable. Letters from the Ministry of Health, Warsaw, Poland, and from faculty at the Medical Academy at Lublin, Poland, say, respectively: 1) At the time Burzynski was in school, medical schools did not give a Ph.D. (Nizanskowski 1992); 2) Burzynski received the D.Msc. in 1968 after completing a one-year laboratory project and passing an exam (Kleinrok 1993). Burzynski did no independent research while in medical school (Bielinski 1987).

Phenylacetic acid (PA) is produced during normal metabolism. In humans, it is detoxified in the liver to phenylacetyl glutamine (PAG) and is excreted as such in the urine. When urine is heated with acid, the PAG loses water and becomes the insoluble 3-N-phenylacetylamino piperidine 2,6-dione. This is Burzynski's original A-10, the supposed anti-cancer peptide. Needing a way to make this "soluble," Burzynski treated A-10 with alkali. But treating insoluble A-10 with alkali does *not* make the A-10 soluble. It simply reinserts water into the molecule and regenerates the original PAG. This is his AS-2.5. From this, AS-2.1 is formed by the further treatment of AS-2.5 with alkali, which degrades it to a mixture of PA and PAG. Currently, Burzynski treats patients with AS-2.1 (PA and PAG) and what he calls A-10. But this "A-10" is really alkali-treated A-10. In other words, it is AS-2.5, or PAG. This is significant in view of the fact that Burzynski himself has reported that PAG is ineffective as a treatment for cancer (Burzynski 1985 and 1986).

Advertising, not science, is the lifeblood of these treatments.

Burzynski's definition of antineoplastons has changed with each new product. The first preparations made from human urine (A-1 through A-5) were said to be information-carrying peptides. But the chromatograms of these show they are all the same. When he recovered insoluble A-10 from acid-treated A-2 and realized it came from urinary PAG, he added "amino acid derivatives" to his definition. Since neither AS-2.1 nor soluble "A-10" are peptides, he dropped that term from the definition.

Burzynski claims that A-10 acts by intercalating DNA. This conclusion was reached in molecular modeling experiments using the piperidine. But the soluble "A-10" is not the piperidine. It is PAG, and PAG does not intercalate DNA.

These facts, along with Burzynski's failure to demonstrate that antineoplastons can "normalize" cancers in patients, force one to conclude that his claims for an effective treatment of cancer are not believable.

The Gerson Diet and Detoxification with Coffee Enemas

The use of diets and coffee enemas to treat cancer is based on the teachings of Max Gerson, a German M.D. who practiced about seventy-five years ago when the biology of cancer was virtually unknown. He believed that cancer was a degenerative disease that developed when aerobic energy metabolism in the liver and intestine was converted to anaerobic metabolism by "poisons" from processed foods.

The idea that purges could rid the body of its "corrupt humors" has been practiced by "healers" since the fifth century. Proponents promoting coffee enemas still believe that "an unpoisoned body" possesses reserves that can recognize and destroy cancer. Gerson's treatment requires patients to have a prolonged period of detoxification with coffee enemas and to adhere, for life if possible, to a diet of juices from raw fruits, vegetables, and calf liver, all produced without pesticides or fertilizers and prepared without sugar, starch, salt, or artificial coloring.

Proponents of the Gerson treatment allege that normal cells depend on oxygen and oxidizing enzymes to maintain aerobic metabolism. When this system is poisoned by "toxins" in

processed foods, it falls back into anaerobic metabolism, produces inferior energy, and becomes cancer. Detoxification is accomplished with enemas containing coffee because coffee stimulates liver bile production and activates an enzyme, glutathione-s-transferase, which neutralizes the free radicals in the blood. The coffee enema causes the toxin-laden bile to be flushed out of the gallbladder into the intestines and through the colon to be excreted. Gerson has stated that for a patient to be "healed," the patient's body must be detoxified. After detoxification, he says, the essential organs will destroy the cancer by an inflammatory allergic reaction. Healing is activated by the special diet of natural nontoxic foods that include "ionized minerals of the potassium group, juices of green leaves and raw calves liver, thyroid extract, and iodine" (Green 1992b).

Rebuttal: Over the last thirty years the scientific literature has shown that: carcinogens are not respiratory poisons; most respiratory poisons are not carcinogens; oxygen does not inhibit the growth of cancer cells either in vitro or in vivo; the absence of oxygen does not induce or accelerate cancer growth; effective anticancer drugs are the ones that affect DNA synthesis not fermentation; energy from fermentation is not inferior by any measure; tumors increase oxidative metabolism of fats and carbohydrates to gain energy; and there is no evidence of the "poisoning" of aerobic metabolism in tumor cells (Aisenberg 1961).

The hepatology literature does not show that bile is a vehicle for toxin removal. A primary function of bile is to move metabolites from the liver to body tissues. To conserve bile and to ensure that the metabolites it carries are not lost during transit through the intestine, more than 95 percent of the bile entering the intestines is reabsorbed and returned to the liver before it reaches the colon. If Gerson's postulate were true, toxins carried in the bile would not be excreted but would recirculate through the body endlessly (Arius 1982).

Coffee does not stimulate bile production; it causes release of bile from the gall bladder. Bile does not contain glutathione, and glutathione is not a precursor for bile formation (Chasseaud 1979).

In the short term, the action of an enema causes an insignificant loss of bile from the intestine. But the amount of bile lost from frequent enemas over a period of months is appreciable. Under such circumstances, severe nutritional consequences associated with malabsorption can and do result (Eisele and Reay 1980).

The pathogenesis of inflammation and its role in the immune system have been defined in studies showing that inflammation suppresses fat metabolism and cellular oxidations, and increases the rate of glycolysis, tissue wasting, septic shock, and hemorrhagic necrosis in all cells, normal and malignant. Proponents of the Gerson treatment have never shown that there is a "healing" inflammatory process that focuses specifically on tumor cells.

Finally, Gerson proponents have never identified the "poisons" in processed foods and have never shown them to be present in voided enema fluids or that an all-natural diet of the juices of raw fruits, vegetables, and calf liver can stimulate any kind of "healing." All the evidence in the scientific literature today indicates that mutagenesis, and not the interference with oxidative metabolism, is the cause of cancer (Joklik et al. 1984).

Summation

In 1905 *Collier's* magazine carried a series called "The Great American Fraud—The Evils of Quackery." That series detailed dozens of nostrums in hundreds of pages of text. Here, space limitations made it necessary to demonstrate the results of our critical scientific evaluations on three selected treatments. But, the results speak for themselves. I hope that, as in the cases presented here, the interested reader will see how, with the proper methods, one can identify the frauds and dangers inseparable in today's alternative medicine.

References

Aisenberg, A. 1961. *The Glycolysis and Respiration of Tumors.* New York: Academic Press, 150–7.

Arius, I. M. 1982. *The Liver: Biology and Pathobiology.* New York: Raven Press, 429–65.

Bielinski, S. 1987. Personal communication. Nov. 22.

Burzynski, S. R. 1985. Purified antineoplaston fractions and methods of treating neoplastic diseases. U.S. Patent No. 4,558,057.

Burzynski, S. R. 1986. Preclinical studies on antineoplastons AS-2.1 and AS-2.5. *Drugs Exptl Clin Res Suppl* 1, XII, 11–6.

Chasseaud, L. F. 1979. The role of glutathione and GST in the metabolism of chemical carcinogens and other agents. *Adv. Cancer Res* 29: 175–274.

Chenowith, M. B. 1961. Known and suspected role of metal coordination drug actions. *Federation Proceedings* 20: 125–9.

Cranton, E. M. 1989. *A Textbook on EDTA Chelation Therapy.* New York: Human Sciences Press.

Cranton, E. M., and A. Brecher. 1990. *Bypassing Bypass.* 2d ed. Virginia: Medex Publishers.

Eisele J. W., and D. T. Reay. 1980. Deaths related to coffee enemas. *JAMA*, 1608–9.

Green, S., and A. Mazur. 1956. Catalytic oxidation of adrenaline by ferritin. *J. Biol. Chem.* 220: 237–55.

Green, S. 1992a. Antineoplastons. *JAMA* 267: 2924–8.

———. 1992b. The Gerson treatment for cancer. *JAMA* 268: 3224–7.

———. 1993. Chelation therapy. *Nutrition Forum* 10: 33–7.

Joklik, W. K., et al. 1984. Immunopathology. In *Zinsser Microbiology.* 18th ed. Norwalk, Conn.: Appleton-Century-Crofts, 367–87.

Kleinrock, Z. 1993. Personal communication. Nov. 22.

Nizanskowski, R. 1992. Personal communication. Jan. 15.

Stemmerman, M. B. 1978. Atherosclerosis: The role of blood elements and cellular changes. *Cardiovascular Medicine* 3: 7–36.

Trowbridge, J. P., and G. Gordon. 1985. *Chelation Therapy.* Greenwich, Conn.: Devin-Adair Publishers.

Walker, M., and G. Gordon. 1982. *The Chelation Answer.* New York: M. Evans and Co.

Wilder, L. W., et al. 1962. Mobilization of atherosclerotic plaque calcium with EDTA. *Surgery* 52: 793–5. □

Saul Green, Ph.D., a biochemist retired from Sloan Kettering Institute in New York City, is president of Zol Consultants, Inc., 340 W. 57th St., Suite 8J, New York, NY 10019. (212-957-8029). He is a board member of the National Council Against Health Fraud, an advisor to the American Council on Science and Health, and a member of the Alternative and Complementary Methods Advisory Group of the American Cancer Society.

Skewing the Scientific Worldview

URSULA W. GOODENOUGH

Walk into any bookstore in America, and the books on science will be outnumbered manyfold by the books on "alternative" medicine. Most of the advocated therapies are offered in the context of either time-honored healing traditions (acupuncture, Ayurveda, homeopathy) or some new view of human physiology and disease (touch therapy, shark cartilage). In most of these books, the scientific worldview is used, or *mis*used, to validate the ancient traditions or novel claims; and in those same books, the scientific worldview is commonly discounted or scorned.

The scientific account of the natural world engenders widespread fear and alienation. Many people are deeply concerned about, and resistant to, the concept that humans evolved from animals, that we are mortal, that our minds derive from our brains, and that genes participate in whom we become. Some reject some or all of these concepts outright. Many others express avoidance or aversion: "Maybe some of those things are true, but I don't like to think about them"; or, "Those are scientific theories and scientists have so often been wrong."

When we encounter the scientific worldview in "alternative" writings, we find that authors tend to emphasize those scientific principles that appear to render the physical and biological world less predictable and more mystical and magical. Thus, one reads frequently of the Heisenberg uncertainty principle, quantum indeterminancy, chaos/complexity, and relativity. There is a fondness for punctuated equilibrium and its suggestion of external intervention in evolutionary events. There is continuous reference to the butterfly wing in Japan creating a storm in California.

Interestingly, however, when alternative worldviews are explored, we find that these are usually highly deterministic but, with vigilance, under a person's control. Thus the fates dictated by astrology can be averted with careful monitoring of charts; the effects of disease can be countered with careful consultation of homeopathic treatises and dilution regimens.

The writings of Deepak Chopra exemplify these patterns. Appearing on bookjackets with his M.D. and stethoscope on display, Dr. Chopra offers a fascinating version of reality.

Most of the scientific worldview is not considered at all by Chopra. Instead, he focuses on a few topics—notably brain function, DNA, and quanta—and essentially redefines them to serve as metaphors for his metaphysics/religion. Consider the following from his book *Quantum Healing* (Bantam 1989):

> Every time we think, something material—the neuropeptide—springs out of nowhere. There is some hidden transformation that turns a thought into a molecule. (21)
>
> DNA does not work just from rote memory. It can invent new chemicals at will. (142)
>
> We need to consult the quantum to understand how the mind pivots on the turning point of a molecule. (91)

Nowhere, however, does he indicate that he is rendering these concepts in poetic terms. Occasionally he resorts to anti-science, as when he discounts evolution and genetics:

> A huge hole was punched in the theory of evolution by scientific insistence that the entire chain of evolution came about randomly. . . . Clearly . . . there is a counterforce [intelligence] pushing evolution along. . . . Intelligence holds together the blueprint of each cell in its DNA, and many scientists now believe that same holds true of the entire universe. . . . Something that progresses is showing signs of intelligence, however reluctant mainstream science may be about using the term. (*Ageless Body, Timeless Mind,* Harmony, 1993, 115)

His account of reality is skillfully interwoven with: 1) narrations of miraculous cures and triumphs over the aging process; and 2) Ayurvedic medical practice. Ayurveda entails a mixture of magical healing (e.g., purification of doshas, pulse diagnosis) and sound advice about exercise and relaxation, and it includes the hallmark opportunities for control (e.g., certain body types suggest certain subdoshas).

According to Chopra, "Blending of Ayurveda and Western medicine brings together ancient wisdom and modern science—and the two have proved completely compatible" (*Perfect Health,* Harmony, 1991, 7). For example, in Western medicine, he says, we know that certain "wastes" build up in the body's cells. These wastes can cause DNA to "make mistakes," the cause of most cancers. According to Ayurveda, these wastes are the "litter" from "imbalanced doshas." The Ayurvedic purification treatment, *panchakarma,* involves the ingestion of medicated oil ("to soften up the dosha"), oil massage, laxatives, sweat treatments, and enemas (113, 118–121).

If there is to be any shift in the appeal of such "alternative" writings, there needs to occur something of a seachange. We need to find ways to render scientific reality both accessible and appealing, and those who design and support educational systems need to insist that this reality be conveyed. □

Ursula Goodenough is in the biology department at Washington University, St. Louis, MO 63130.

Taking a Bite out of Shark Cartilage

A tremendous amount of marketing has accompanied the sale of shark cartilage as a preventive and cure for cancer. Do the claims far outstrip the evidence?

LYNN McCUTCHEON

A Tale of Two Wills

Recently I heard a fascinating story about a man we will call Wilhelm, a German POW imprisoned in the Arizona desert during World War II. He stole a local map and was elated to find that there was a river close to the prison camp. Armed with this knowledge, Wilhelm eagerly recruited several other prisoners with the promise of freedom. They invested a great deal of time and energy digging a tunnel and constructing a small boat that would carry them down the river to Mexico. There was some reason to believe that the plan might succeed. The river was only a few minutes from the tunnel opening, and Mexico was only a few miles away. Finally, they finished their tunnel and escaped into the desert night with Wilhelm leading them toward the river.

The saga of Dr. William Lane and the shark-cartilage cure for cancer parallels this story to a large extent. Lane stumbled onto an interesting idea that held out the promise of freedom from the pain and suffering of cancer. The plan was not without some merit, for it was based on sound scientific research. Studies done at Harvard, MIT, and elsewhere had shown that under certain conditions cartilage sometimes prevented cancer from spreading in laboratory animals (Brem and Folkman 1975). Just as Wilhelm had little trouble convincing hopeless prisoners that his plan was workable, so Lane was able to convince cancer victims that shark cartilage offered them some hope.

Both men found success early on. Wilhelm was able to conceal both the tunnel and the boat from his captors. Lane proclaimed the news of studies in Mexico and Cuba that suggested the ingestion of shark cartilage might reduce the size of cancerous tumors (Lane and Comac 1992; McSweeney 1994). Wilhelm actually escaped with his followers and made it all the way to the river without being detected or pursued. William's book, *Sharks Don't Get Cancer* (Lane and Comac 1992), sold so well that it led to a sequel, *Sharks Still Don't Get Cancer* (Lane and Comac 1996). He generated so much interest in shark cartilage that funding was given to researchers to study its effects on human cancer patients under controlled conditions.

But here things take a dramatic turn for the worse for both Wills. When Wilhelm and his compatriots got to the riverbank, they were shocked to find that there was no water. Their seemingly wonderful plan had a serious flaw, and they were recaptured within days. The many critics of William Lane believe that there are serious flaws in his reasoning. They are doubtful that shark cartilage taken orally will ever prove to be a major weapon in the war on cancer. To understand why they are skeptical, let us go back to the beginning of the shark cartilage story.

The Background

Beginning in the early 1970s, Judah Folkman and several colleagues at Harvard and MIT published a series of research papers detailing the use of cartilage as a means of slowing the growth of cancerous tumors. See Folkman and Klagsbrun (1987) for an overview of this research. In some of these studies, the cartilage source was rabbits. In others, it was cattle (bovine); later, sharks. They demonstrated that the growth of a tumor is dependent on a "process through which tumors . . . encourage blood vessel growth in order to supply themselves with nutrients so that they can expand" (Shark cartilage/angiogenesis 1992). This process is called angiogenesis. In other words, solid tumors need a blood supply in order to grow large. Since cartilage usually contains no blood vessels, it was reasoned that something in the cartilage might prevent angiogenesis.

The basic strategy was to implant tumors in laboratory animals and then determine if cartilage delayed angiogenesis. In the Brem and Folkman (1975) study, for example, cartilage was placed between the tumor and a blood supply, and observations were made over a period of time in order to determine if the cartilage slowed or stopped the growth of blood vessels needed to "feed" the tumor. Some control groups received no cartilage, while others received boiled (inactivated) cartilage. The purpose of the latter was to show that the effect was not due to cartilage, per se, but some active chemicals (proteins) in the cartilage. They were able to show that some proteins found in cartilage either halted or (in most cases) delayed angiogenesis slightly.

Langer and colleagues (1976) carried this a step further when they extracted chemicals from bovine cartilage and used the extract alone to inhibit the growth of tumors in rabbits. Injecting the extract into the bloodstreams of rabbits and mice with cancerous tumors greatly inhibited angiogenesis (Langer et al. 1980).

I have read several of the papers authored by Folkman and his colleagues—papers that have appeared in research journals with reputations for publishing top-quality work. In my opinion, their work is quite good, and those experts on cancer research to whom I have talked agree.

Lane Seizes the Shark by the Cartilage

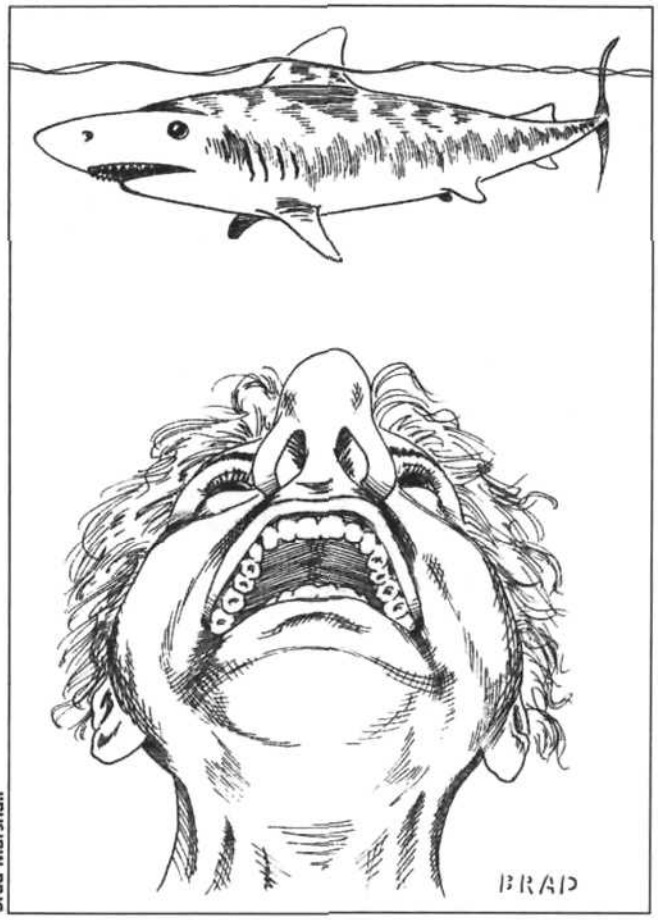
William Lane read a paper by two of Folkman's associates (Lee and Langer 1983) and envisioned a great financial opportunity. What these researchers showed was that shark cartilage produced much the same effect as bovine cartilage. According to cancer researcher John Prudden, Lane came to him in 1983 seeking advice on how to extract shark cartilage (Prudden 1996). In 1990 Lane became the consultant for a company that initiated the commercial production of shark cartilage, and Lane began looking for opportunities to test it on *human* subjects suffering from cancer. He didn't have to wait long.

At the Ernesto Contreras Hospital in Tijuana, Mexico, in 1991, eight cancer patients were given large doses of Cartilade, the brand name of the shark cartilage that the company produced. A year or so later Cartilade was being given to twenty-nine cancer patients in Cuba. Lane proclaimed both the studies and the product to be highly successful, describing them in glowing terms in his books.

Then something went wrong. According to Prudden (1996), the company filed suit against Lane in 1994. The suit was settled out of court. At approximately the same time, according to Prudden, Lane Laboratories was founded. William Lane was a consultant and his son, Andy, was president of the company.

Since then, William Lane has been eager to demonstrate

Lynn McCutcheon, a longtime psychology professor, is a health food store owner who would like to see the industry make a concerted effort to stop the promotion of bogus products. Previously he wrote articles in the SKEPTICAL INQUIRER *on the Bach Flower Remedies (July/August 1995) and aromatherapy (May/June 1996). He can be reached at 240 Harbor Drive, Winter Garden, FL 34787.*



Brad Marshall

that his new brand, BeneFin, is even more effective than Cartilade. This eagerness has led to sponsorship by Lane Laboratories of at least two studies. The first is unpublished, although Lane Laboratories has summarized its results in its advertising and in a newsletter (Lane 1996). Dr. James Lott implanted tumors in three groups of mice. Then either bovine cartilage, Cartilade, or BeneFin was administered orally. When the animals died, the tumors were removed and magnified slides were made. The slides appeared to be quite different from each other, a fact interpreted by Lane to mean that BeneFin is a superior product.

In the other study sponsored by Lane Laboratories, Martin Milner (1996) interviewed twenty-one cancer patients by telephone. Each had used shark cartilage and had voluntarily contacted Lane Laboratories to express their satisfaction with it. In the telephone interviews, several reported a reduction in tumor size, and most reported a significant improvement in the quality of their lives. Lane (1996) interpreted this as evidence that the human body can absorb the protein molecules found in shark cartilage when taken orally.

The Numbers Game

Why are some critics skeptical about the claims made for shark cartilage? We can get some idea by looking at a few numbers. Eight Tijuana cancer clinics were cited by Dr. James Lowell in a report on Mexican cancer clinics (Lowell 1991) as having used dubious cancer treatments. One of those eight was the Ernesto Contreras Hospital, where a number of questionable treatments were employed, including laetrile, Bible study, and sing-alongs. Because the first printing of the book containing Lowell's article appeared in late 1990, and because it was published by the American Cancer Society, it seems possible that Lane might have been aware of the hospital's reputation before he hooked up with Contreras in 1991.

Eight is also the number of patients who received shark cartilage at the Contreras Hospital. It is very difficult to draw firm conclusions from such a small sample—a problem compounded by the fact that one of the eight quit the treatment and two others had emergency operations while still taking shark cartilage.

Then we have the number of living patients from the Cuban study. An unpublished paper given to me by someone from Lane Laboratories states on page 209 that out of twenty-nine patients, sixteen improved or at least didn't worsen during treatment. An additional six showed "at least short-term improvement during treatment." Twenty-nine minus twenty-two equals seven patients who died. However, further down the page, we find that "eight patients died during the study." In an address Lane gave in late 1993, he was quoted as saying that "of the original twenty-nine patients, nine died during the study" (Lane 1994, 26).

How have the surviving patients fared since the completion of the study? The June 3, 1996, *Orange County Register* (Dold 1996) ran a story in which Lane was reported as claiming that, as of then, three and a half years after the study was completed, fourteen of the patients were cancer-free. But in April of 1996, another individual close to the shark-cartilage controversy claimed that all of the patients in the Cuban study were now dead (Prudden 1996). I suppose it could be argued that dead patients are cancer-free, so maybe *both* statements are correct.

There are other numbers too, like the ones that appeared on page 210 of the aforementioned unpublished paper from Lane Laboratories. On that page are six columns of ten numbers—data from a subset of the patients in the Cuban study. When I crunched those same numbers on my computer's statistical program, I found that five of the twelve values reported at the bottom were wrong (two means and three standard deviations). Most of the errors were small, but one of the standard deviations was way off the mark.

Landmark Literary Lane-isms

I have a number of favorite curious statements made by Lane or his associates. Here are some of my favorites.

According to Lane, they have had "countless positive reports of tumor reductions from patients using only BeneFin shark cartilage" (Lane 1996, 1). Maybe so, but where are they? In the Mexican, Cuban, and Milner studies, virtually all of the

patients previously received either chemotherapy, surgery, radiation, or some combination thereof. In some cases, these other treatments were given only a few weeks before shark cartilage therapy was initiated. This makes it difficult to tell whether the "success" of these studies was due to shark cartilage.

"They have followed my research, however, and it has even been written up in the July 1992 *Journal of the National Cancer Institute*" (Passwater 1993, 79). Actually, Lane's name was not mentioned in one of the two articles on shark cartilage that appeared in that issue (Shark cartilage/angiogenesis 1992). The research cited was that of Langer and Folkman, both of whom are unhappy about the way Lane has interpreted their research (Kirchhof and Kirchhof 1995). In the other article (Mathews 1992), Lane was mentioned, but the author's major purpose was to highlight the research of Langer and of Carl Luer, who also opposes what Lane has done. The article concludes by mentioning the skepticism expressed by scientists "about Lane's use of shark cartilage pills" (1002), and by emphasizing the need to understand how something works before we use it on humans.

"I'm a scientist," Lane has said. "If I can't do it the right way, I'm not going to do it" (Snyder 1996). Scientists have been among the most vocal critics of Lane's work (Mathews 1993; Prudden 1996). Most scientists agree that the right way to conduct the Mexican and Cuban studies would have been to randomly assign half of the subjects to the shark cartilage group and the other half to a placebo group. The placebo should have been made to look, smell, and taste as much like the shark cartilage as possible. The treatments should have been given to patients who did not know which treatment they were getting by research assistants who did not know which treatment they were administering. Inferential statistics should have been used to determine if any differences between the two groups were reliable. None of these things were done *in the Mexican, Cuban, or Milner studies.*

"The data have been presented to some of the more critical organizations, including some of the best known cancer research centers, and to date, not one has expressed anything but major interest" (Lane n.d., 7). The "Sixteen Questions" brochure from which this quote was taken probably originated in 1995, because it also refers to BeneFin as a new product. At that time Lane's ideas had already been criticized by representatives of the National Cancer Institute and the American Cancer Society (Mathews 1993). More recently, spokespersons for the Foundation for Cartilage and Immunology Research have been sharply critical of Lane's ideas as well as his practices (Kirchhof and Kirchhof 1985; Prudden 1996). Despite these criticisms, the above quote from Lane, along with the rest of the "Sixteen Questions" brochure, was still available on the Internet at least as recently as March of this year.

Here's a gem from Martin Milner, an associate of Lane's: "This study was funded by Lane Labs . . . with the understanding in advance that the results would be published regardless of the findings" (Milner 1996, 99). I appreciate the need for an understanding of this sort when a sponsor is financially supporting a research project that evaluates the sponsor's product. I had a similar agreement with a supplement manufacturer when I did a double-blind study evaluating one of its products (McCutcheon 1996), and the sponsor honored that agreement in spite of a mostly negative outcome. The problem with Milner's statement is that, because of the way his subjects were chosen (all had previously reported beneficial effects to Lane Laboratories), there was no way the study could have yielded anything other than a positive outcome.

Referring to the unpublished study by Lott in which mice with cancerous tumors received BeneFin, Cartilade, or bovine cartilage, Lane had this to say: "BeneFin performed far better than all other products tested—showing no toxicity and incredible efficacy against solid tumors" (Lane 1996, 2). However, Lott told me that his work showed only that the three products yielded slides of the magnified tumors that looked noticeably different from each other (Lott 1997). He was *not* willing to conclude that BeneFin was necessarily a better product. Furthermore, he told me that he had found no significant difference in longevity among the three groups. If human cancer patients had a choice between living a long period of time or a shorter time but having their tumors look different on a slide, which do you think they would choose?

In commenting on the need to follow the progress of cancer patients, Lane said: "Many treatments provide an excellent *initial* response. They shock the tumor and stop its growth, but only temporarily" (Lane and Comac 1996, 174). In other words, we need to track subjects who participate in cancer treatment studies for a long time, to make sure that the effect was more than just a blip on the radar screen. With that thought in mind, we might ask why there was no long-term followup in the Mexican study?

What Lies over the Horizon?

One of the principle objections to Lane's marketing of shark cartilage is that it is worthless when taken orally (Shark cartilage/angiogenesis 1992). Some experts believe that none of the protein molecules that fight angiogenesis can survive the digestive process (Mathews 1992), but others disagree (Blackadar 1993; Gardner 1988; Simone 1997). What percentage of these molecules survive digestion intact and eventually get to the site of the tumor? It isn't clear, yet, but my reading of Gardner's paper suggests that it is likely to be small. If the percentage is near zero then the oral use of shark cartilage should decline, and we can hope that the ongoing attempt to synthesize the antiangiogenic molecules found in cartilage is successful.

At this point, it is fair to say that shark cartilage taken orally is unproven as a cancer remedy for humans. That, combined with its high cost, would discourage me from taking it as a preventative measure. For those who already have cancer, I would discourage its use by anyone who is pregnant or trying to become so, and anyone who is recovering from wounds, just in

case it does have some small effect. The growth of new blood vessels is vital for these people. It is also unlikely to work on the several kinds of cancers that do *not* rely on the process of angiogenesis. I would also recommend against its use by anyone who is not psychologically prepared to deal with the possibility that it might not work at all. Finally, and most important, it should *never* be used alone as a substitute for the more conventional forms of cancer treatment.

One point on which I agree with Lane is the need for top-quality, double-blind research in which human cancer patients are orally given shark cartilage or a placebo and carefully studied for a long time. Fortunately, a few such studies have been approved and funded in the mid-1990s. I know that some of them are nearing completion (Simone 1997).

William Lane has worked tirelessly to convince others that shark cartilage is the tunnel that leads to freedom from cancer. Many people have risked their lives and a significant portion of their income to buy a seat on his boat. I believe that the river bed is just over the horizon. Will there be any water in it?

Give your favorite people a subscription to the magazine for science and reason.

Skeptical Inquirer

❑ Check or money order enclosed

Charge my: ❑ MasterCard ❑ Visa

Card # _____ Exp._____

Signature _____

Name _____

Address _____

City _____

State _____ Zip _____

Phone _____

1 $26 for first one-year subscription (save 20%)

Name _____

Address _____

City _____

State _____ Zip _____

2 $24 for second one-year subscription (save 26%)

Name _____

Address _____

City _____

State _____ Zip _____

3 $21.50 for third one-year subscription (save 34%)

Name _____

Address _____

City _____

State _____ Zip _____

Total $ _____

(Outside the U.S., please pay in U.S. funds drawn on a U.S. bank. If you live outside North America add $8.00 a year.)

Order toll-free: 1-800-634-1610
(Outside U.S. call 1-716-636-1425)

Or mail to: **Skeptical Inquirer, Box 703 Amherst, New York 14226-0703**

References

Blackadar, C. B. 1993. Skeptics of oral administration of shark cartilage. *Journal of the National Cancer Institute* (December): 1961–2.

Brem, H., and J. Folkman. 1975. Inhibition of tumor angiogenesis mediated by cartilage. *Journal of Experimental Medicine* 141: 427–39.

Dold, C. 1996. Controversy surrounds the sale of shark-cartilage pills as a cure for cancer. *Orange County Register*, June 3.

Folkman, J., and M. Klagsbrun. 1987. Angiogenic factors. *Science* 235: 442–7.

Gardner, M. L. 1988. Gastrointestinal absorption of intact proteins. *Annual Review of Nutrition* 8: 329–50.

Kirchhof, D., and E. Kirchhof. 1995. *The Successful Use of Bovine Tracheal Cartilage in the Treatment of Cancer*. Belgrade, Mont.: Kriegel & Associates.

Lane, I. W. 1994. Shark cartilage modulates angiogenesis. *Vitamin Retailer* (March): 25–7.

———. 1996. *Shark Cartilage Update* 3(2).

———. n.d. *Sixteen Questions Most Often Asked of Dr. I. William Lane*. Kerrville, Tex.: Information Services.

Lane, I. W., and L. Comac. 1992. *Sharks Don't Get Cancer*. New York: Avery.

———. 1996. *Sharks Still Don't Get Cancer*. New York: Avery.

Langer, R., H. Brem, K. Falterman, M. Klein, and J. Folkman. 1976. Isolation of a cartilage factor that inhibits tumor neovascularization. *Science* 193: 70–2.

Langer, R., H. Conn, J. Vacanti, C. Haudenschild, and J. Folkman. 1980. Control of tumor growth in animals by infusion of an angiogenesis inhibitor. *Proceedings of the National Academy of Sciences* 77: 4331–3.

Lee, A., and R. Langer. 1983. Shark cartilage contains inhibitors of tumor angiogenesis. *Science* 221: 1185–7.

Lott, J. 1997. Personal communication.

Lowell, J. A. 1991. Mexican cancer clinics. In *Dubious Cancer Treatment*, edited by S. Barrett and B. Cassileth. Tampa, Fla.: American Cancer Society.

Mathews, J. 1992. Sharks still intriguing cancer researchers. *Journal of the National Cancer Institute* (July): 1000–2.

———. 1993. Media feeds frenzy over shark cartilage as cancer treatment. *Journal of the National Cancer Institute* (August): 1190–1.

McCutcheon, L. E. 1996. Treatment of anxiety with a homeopathic remedy. *Journal of Applied Nutrition* 48: 2–6.

McSweeney, D. 1994. Shark cartilage attacks illness. *Vitamin Retailer* (March): 22–5.

Milner, M. 1996. Follow-up of cancer patients using shark cartilage. *Alternative Complementary Therapies* 2: 99–109.

Passwater, R. A. 1993. Shark cartilage and cancer. *Whole Foods*, pp. 42, 44, 76, 79.

Prudden, J. F. 1996. Position paper on cartilage therapy history and comparison of bovine and shark cartilage. *Townsend Letter for Doctors and Patients* (April): 44–7.

Shark cartilage/angiogenesis. 1992. *Journal of the National Cancer Institute* (July), news section.

Simone, C. 1997. Personal communication.

Snyder, B. 1996. FDA OKs shark cartilage for tests on cancer patients. *Nashville Banner*, July 10. □

Medical School Faith Healing: Report on a Spirituality Conference

BRYANT FURLOW

Organizers of two medical school conferences held earlier this year—the University of New Mexico medical school's "Spirituality and Health Care" conference, held in Albuquerque in February, and Harvard's "Spirituality and Healing in Medicine" meeting in Los Angeles in March—pushed faith healing a step closer to inclusion in mainstream medical school education.

With the increasingly evident healing power of placebos, understanding how religiosity and faithful acts like prayer affect the physiology and immune response of patients is of legitimate concern to biomedical researchers. Conferences reporting on empirical studies of such issues would be welcomed by medical researchers, who increasingly recognize that, if nothing else, placebos promise to improve pain management in clinical settings. Unfortunately, the organizers and speakers of this past spring's spirituality conferences seemed more intent on the remystification of medicine than on the empirical study of placebo effects.

Both conferences were funded by the John Templeton Foundation, named for the Wall Street tycoon and devout Christian who awards millions of dollars annually to teachers, researchers, students, and institutions that incorporate Christian theology into the study of the life sciences. The Templeton Foundation (http://www.templeton.org/) also distributes classroom curricula that depict biblical creationism as a scientific alternative to the "scientific imperialism" of "establishment scientists" (T. Peters, "Theology and Science: Where Are We?" *Journal of Religion and Science* 31[2], distributed on the Templeton Foundation Web site).

Offered academic credit by the University of New Mexico medical school, attendees at the New Mexico conference paid hundreds of dollars apiece to hear the latest "evidence" that distant prayer, faith healing, and curative "subtle energies" play a vital role in the treatment of patients afflicted with cancer, AIDS, and other diseases. Featured lectures ranged from the relatively level-headed—such as that of epidemiologist Jeff Levin of the Eastern Virginia Medical School, who presented evidence that lack of religious affiliation represents a health risk factor for the elderly—to the downright disturbing. UNM psychiatrist Scott Walker, for instance, presented the results of his study of the effects of distant prayer on recovery rates among alcoholics. Walker was awarded $30,000 from the National Institutes of Health's Office of Alternative Medicine for the study. He told the audience that his study's failure to show that secret prayer by strangers benefits recovering alcoholics may be due to prayers by his opponents that the study would flop.

Other speakers were unhappy that faith healing wasn't getting a second chance from NIH. Elisabeth Targ, M.D., of the California Pacific Medical Center in San Francisco, expressed frustration that NIH would not fund her study of distant prayer healing of AIDS patients. She refused to discuss the results of a pilot study on distant healing but insisted that faith healing offered a more promising cure for people with AIDS than the medical establishment concedes.

"We simply don't know that prayer cannot cure AIDS," Targ told the audience. "More research is needed."

Princeton University professor of engineering Robert Jahn reported that an output of random number generators can be influenced by the intentions of distant, concentrating volunteers but did not share information that would allow independent evaluations of his analyses (such as number of trials run or variance in results). Jahn asserted that his results point to heterosexual couples faring better at exerting influence from a distance on number generator outcomes than unpaired individuals or same-sex couples. Since Jahn's studies suggest that results can be influenced ahead of time, not just while random numbers are

Bryant Furlow studies behavioral ecology at the University of New Mexico. He has published papers and articles in the scientific and popular press, including the Proceedings of the Royal Society of London: Biological Sciences *and* Psychology Today.

being generated, he concluded that the influenced outcomes are due to answered wishes rather than telekinesis.

Marilyn Schiltz, of the Institute for Noetic Sciences in Sausalito, California, told of her joining in the traditional faith healing of an Amerindian child in the Amazon who was sick beyond hope. "There was nothing left to do but pray," Schiltz told conference goers. The morning after the prayerful gathering in the village, however, the child was playing with her friends, running, and laughing. Schiltz offered no indication that she had considered the possibility that her prognosis for the child was mistaken.

Many of the meeting's speakers have enjoyed uncritical coverage by the popular media. Keynote speaker Larry Dossey, M.D., has enjoyed particular success with media personalities, appearing on the television show *Oprah*, and earlier this year authoring an unchallenged essay in the March/April 1997 *Psychology Today* magazine on the potentially dangerous efficacy of prayer. In the article, Dossey asserts that otherwise inexplicable stumbles by talented professional athletes makes sense if one understands that fans of the opposing team are, by chanting and jinxing players, essentially praying for divine intervention. Fumbled balls, in other words, are evidence of prayer's everyday power.

In a special report for the magazine *Healthy Living* (Spring/Summer 1997), science writer Debra Kent suggested that prayer may be "more potent than penicillin." Kent cites studies that suggest religious affiliation is associated with lower rates of heart disease as "proof" that prayer works. Quoting Dossey's book *Healing Words*, Kent explained that the failure of prayer to achieve a desired end is not evidence that prayer is ineffective. On the contrary, Dossey and Kent tell their readers, it is evidence of God's prevailing wisdom to sometimes tell the prayerful, "No."

Newsweek's March 31 cover story, "The Mystery of Prayer," was more cautious, and even included a long sidebar story on Carl Sagan's critiques of prayer power.

According to a *Newsweek* poll, 79 percent of Americans surveyed believe that God answers prayers to heal someone with an incurable disease. These people buy books. These people want their government to fund research on prayer. As was evident in the lobby of the New Mexico conference during intermissions (and during talks in which speakers repeatedly mentioned their books), authors' commissions and securing alternative medicine grants were high on the agenda of conference organizers and speakers. □

Anti-Quackery Newsletter Relaunched

A bimonthly newsletter that's been on the front lines of the anti-health-fraud movement since 1984 just got a shot in the arm. *Nutrition Forum*, published by Prometheus Books, has been relaunched to focus more sharply on nutrition quackery and misinformation and to offer more exposés of dubious nutrition claims, products, and practitioners. It has also been given a graphic redesign and new departments including Web Watch, Journal Spotlight, Book Reviews (with each book rated according to reliability), and Readers' Forum.

Heading up these changes is new editor Lewis Vaughn, a veteran health journalist and the coauthor (with Theodore Schick) of the critical thinking textbook *How to Think About Weird Things*. Vaughn plans other changes to make the newsletter even more useful to those who want to stay abreast of developments in the field. The consulting editor is CSICOP fellow Stephen Barrett, M.D., and the sixteen-member editorial board includes William Jarvis, co-chairman of the CSICOP subcommittee on Health Claims.

For subscription information, call 1-800-421-0351, or write Nutrition Forum, Prometheus Books, 59 John Glenn Dr., Amherst NY 14228-9826. (There are subscription rates for both individuals and institutions.)

You can make a lasting impact on the future of skepticism... when you provide for the *Skeptical Inquirer* in your will.

CSICOP and the *Skeptical Inquirer* changed the terms of discussion in fields ranging from pseudoscience and the paranormal to science and educational policy. You can take an enduring step to preserve their vitality when you provide for the *Skeptical Inquirer* in your will.

Your bequest to CSICOP, Inc., will help to provide for the future of skepticism as it helps to keep the *Skeptical Inquirer* financially secure. Depending on your tax situation, a charitable bequest to CSICOP may have little impact on the net size of your estate—or may even result in a greater amount being available to your beneficiaries.

We would be happy to work with you and your attorney in the development of a will or estate plan that meets your wishes. A variety of arrangements are possible, including: gifts of a fixed amount or a percentage of your estate; living trusts or gift annuities, which provide you with a lifetime income; or a contingent bequest that provides for the *Skeptical Inquirer* only if your primary beneficiaries do not survive you.

For more information, contact Barry Karr, Executive Director of CSICOP, at (716) 636-1425. All inquiries will be held in the strictest confidence.

New Journal Defends Scientific Medicine

The public, the media, and even some physicians seem enthralled by the unexamined promises of "alternative" or unconventional treatments. Yet there has been no scientific journal dedicated exclusively to carefully scrutinizing the onslaught of dubious claims. Until now.

The *Scientific Review of Alternative Medicine* has just been launched to fill the void. It's a peer-reviewed medical journal whose aim is to provide objective, scientific assessments of the treatments, methods, and hypotheses of unconventional medicine. The editor is CSICOP fellow Wallace Sampson, M.D., clinical professor of medicine at Stanford University; and the executive editor is Lewis Vaughn, coauthor (with Theodore Schick) of the critical thinking text *How to Think About Weird Things*. Prometheus Books publishes the journal, and it has been endorsed by the Council for Scientific Medicine, a group of physicians, scientists, and others concerned about the lack of critical scrutiny of "alternative" medicine.

The journal is issued twice a year, but frequency may increase later. A subscription is $50 for individuals and $90 for institutions.

To affirm its support for scientific medicine and this new journal, the Council issued this statement:

> In recent years a wide range of unconventional therapies has appeared on the public scene. These are offered as "alternative" or "complementary" to mainstream medicine. And they include everything from herbal medicines, homeopathy, and aromatherapy to the use of acupuncture, therapeutic touch, prayer at a distance, faith healing, chelation therapy, and "miraculous" cancer cures.
>
> We, the undersigned, believe that the need for objective, scientific critiques of the claims of "alternative" or non-conventional medicine has never been greater. This conclusion seems inescapable because . . .
>
> - There is a general lack of readily available, reliable information about the efficacy of such treatments. This impairs people's free choice and increases risks to their health. The potential harm is incalculable but appears to be growing. The trend is abetted by those who promote unproven treatments, especially those who are naive, greedy, or unscrupulous.
> - The media all too often dote on controversial and false claims but unfortunately provide few careful, critical examinations of them, usually preferring to titillate, pander, or entertain. Often what the public hears is anecdotal testimony of people allegedly cured, not the results of scientific research. Many best-selling books promote the power of such alleged healings, but they hardly pass the scrutiny of peer review.
> - Several new journals devoted exclusively to "alternative" medicine have appeared recently, but they merely advocate unconventional treatments and rarely assess them objectively.
> - Both the public and some medical professionals seem unaware that credible, scientific assessments of many "alternative" medicine claims already exist—and that new evaluations based on available information are possible.
> - There is a critical need to test new claims before they are marketed to the public.
>
> We therefore welcome the founding of the *Scientific Review of Alternative Medicine*—the first peer-reviewed journal dedicated entirely to the scientific, rational evaluation of unconventional health claims.
>
> Its purpose is to apply the best tools of science and reason to determine the validity of hypotheses and the effectiveness of treatments. It will dismiss no claim a priori, but consider it on its merits. It will reject no claim because it fits, or fails to fit, some paradigm. It will, using scientific methods and reasonable criteria, seek justified answers to two questions: "Is it true?" and "Does this treatment work?" It will call for double-blind controlled trials of "alternative" therapies.
>
> We believe that the launching of the *Scientific Review of Alternative Medicine* is now imperative. We therefore call for physicians, scientists, health practitioners, and citizens everywhere to join us in supporting this important venture to advance scientific medicine and to expand the benefits of people's free and informed choice.

Signers of the statement are charter members of the Council for Scientific Medicine and include:

Stephen Barrett, M.D., *Consumer Health, Allentown, Penn.*
Barry Beyerstein, Ph.D., *Psychology, Simon Fraser University*
Luther Cobb, M.D., *Surgery, Stanford University*
Saul Green, Ph.D., *Biochemistry, New York*
Victor Herbert, M.D., *Hematology, Nutrition, Mt. Sinai University, New York*
William Jarvis, Ph.D., *Public Health, Loma Linda University*
Melvin Kirschner, M.D., *Medicine, Public Health, Los Angeles*
Arthur Kornberg, M.D., *Stanford University (Nobel Laureate)*
James Lowell, Ph.D., *Biology, Pima College, Tucson*
Loren Pankratz, Ph.D., *Psychology, University of Oregon*
Gary Posner, M.D., *Internal Medicine, Fort Lauderdale, Fla.*
John Renner, M.D., *Medical Education, Kansas City*
Wallace Sampson, M.D., *Medicine, Stanford University*
Bela Scheiber, *Engineering, Boulder, Colo.*
Thomas Wheeler, Ph.D., *Biochemistry, University of Louisville*

To subscribe: call (800) 421-0351; fax your credit card number to (716) 691-0137; e-mail PBooks6205@aol.com; or write SRAM, Prometheus Books, 59 John Glenn Dr., Amherst NY 14228-9826. Affiliations listed for identification only.

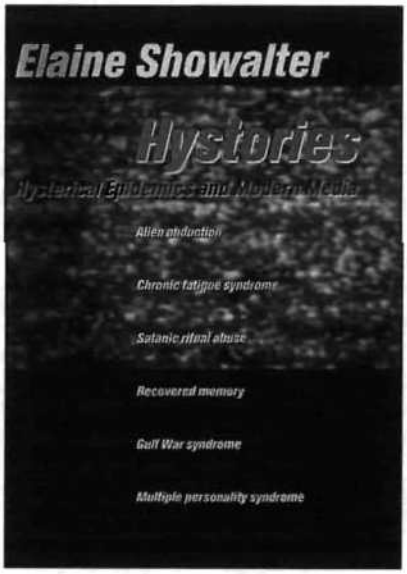
Tales of Hysteria

TANER EDIS AND AMY SUE BIX

Hystories: Hysterical Epidemics and Modern Culture. By Elaine Showalter. Columbia University Press, New York. 1997. ISBN 0-231-10458-8. 244 pp. Hardcover, $24.95.

We skeptics do more these days than shake our heads at psychics or roll our eyes at UFO-abduction tales. Because postmodern humanities scholars seem out to drag science down, the SKEPTICAL INQUIRER keeps tabs on relativist philosophers, literary critics, Freudian psychoanalysts, and feminist critics of science, as well as the usual suspects. So when a feminist literary critic with a soft spot for psychoanalysis writes a book about topics like alien abduction and satanic ritual abuse, we might expect some gobbledygook about validating the experiences of those people dismissed by the scientific elite and so on. Elaine Showalter—president-elect of the Modern Language Association, no less—would make us think again. *Hystories* is not only a skeptical book, but an important book many skeptics can benefit from.

Showalter is not interested in defending the truth of recovered memories or alien-abduction tales; in fact, she thinks they're obviously false. She does, however, want to explain why such beliefs are so common. Her central idea is that these beliefs are part of *hysterical epidemics*. She describes America as "a hot



zone of psychogenic diseases, new and mutating forms of hysteria amplified by modern communications and fin de siècle anxiety." Modern media and rapid electronic communications make it possible for "microtales of individual affliction" to explode into "panics fueled by rumors about medical, familial, community, or governmental conspiracy." Our culture creates plenty of opportunity for psychological trouble and then provides fantastic tales for people to grasp at to make sense of their condition. Especially when troubled people connect to support networks and authority figures like therapists, stories with no basis in reality take on a life of their own.

No surprises so far. In an alien-abduction report, for example, we can easily see a stereotyped, media-spread tale that helps people make sense of sexual conflicts and strange experiences like sleep paralysis. We also notice therapists who collaborate not so much in revealing what happened as in creating the story in the first place. Showalter, however, uses her background as an English professor to explore the *stories* and the cultural and political landscape in which these stories come to life. She also looks at the history of psychology and contagious delusions and puts it in a context of gender politics, cultural anxieties, even literary inspiration. The result is a portrait of hysteria that gives no quarter to false beliefs yet is also aware of how the label "hysteria" has long been employed "to ridicule and trivialize women's medical and political complaints." Showalter leads us to see hysteria as a way, sometimes the only way, suffering people can express themselves.

What, then, are the hysterical epidemics of our day? Showalter talks about recovered memories, multiple personalities, satanic ritual abuse, and alien abduction. More controversially, she adds chronic fatigue illness and Gulf War syndrome. These, she argues, are all troubles for which no convincing medical or external explanation can be found, and all follow the typical pattern of a hysterical epidemic. Showalter's treatment of subjects like recovered memories, ritual abuse, and alien abductions reflects sources and themes from the skeptical literature, and her direct and sympa-

Taner Edis is a physicist and manages the e-mail discussion group SKEPTIC (send "info skeptic" to listproc@listproc.hcf.jhu.edu). Amy Sue Bix is an assistant professor of history with the Center for Historical Studies of Technology and Science at Iowa State University.

thetic style of writing makes her account attractive. Humor also helps, as when she skewers Harvard psychiatrist John Mack for his support of UFO abductions by coining "Showalter's Law: As the hystories get more bizarre, the experts get more impressive."

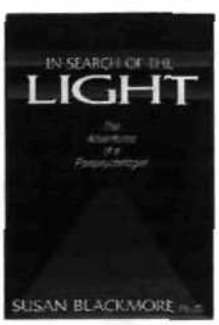
Hystories is a good book, but it also has its dubious points. For example, Showalter overemphasizes end-of-century panics. She treats claims of extraordinary apocalyptic fears around the year 1000 as fact, while most historians think no unusual panic occurred at the time. Skeptics are not likely to share Showalter's favorable view of psychoanalysis either. She mostly agrees with recent critics of Freud, such as Frederick Crews, but believes we have no alternative as yet to modern psychoanalysis as a way of thinking about ourselves and our stories.

Showalter is also overly hasty in calling chronic fatigue and Gulf War syndrome hysterias. New information is still emerging about operations in the Gulf War, and researchers have just begun exploring how different medicines, chemicals, and environmental exposure *may interact in complex, unanticipated* ways. Certainly, veterans' affairs have become politicized, and psychological factors and communication of rumors have spread questionable beliefs. But Showalter should also have underlined more explicitly the uncertainty, incompleteness, and mistakes in emerging science. A physical ailment with unconventional, complex causes is not as outlandish a hypothesis as an alien abduction. Showalter should also have done more to acknowledge the non-paranoid *reasons some women can be suspicious* of our medical system. Medical science has produced real disasters like the Dalkon Shield and DES, and it has a history of neglecting women as research subjects. This is no excuse to support hysterias or alternative medicine, but skeptics should be more aware of the problematic historical relationship between women and medical science.

Though not without flaws, *Hystories* is especially important for showing how skeptics can build bridges to communities that seem indifferent and sometimes even hostile to skepticism. For example, skeptics have an ambiguous relationship with feminism. Hysteria is largely a female affliction, and too many feminists have supported movements like recovered memory and satanic ritual abuse. Showalter describes hysteria as a desperate expression of pains and fears that cannot find any other socially acceptable voice, and she challenges us to find ways to meet our genuine emotional and sexual needs without endorsing hysterical stories. She declares, "Feminists have an ethical as well as an intellectual responsibility to ask tough questions about the current narratives of illness, trauma, accusation, and conspiracy," adding that, "[T]oday's feminists need models rather than martyrs . . . courage to think as well as the courage to heal." Those people to whose stories Showalter denies truth will not see her as a sympathetic critic, but she is unapologetic about her skepticism: "Feminism has a strong enlightenment, rationalist tradition of debate and skepticism. . . . Our primary obligation must *always be to the truth.*" *On the flip side,* skeptics who are tempted to think of feminism only as a shrill political movement out to corrupt science have much to learn from Showalter as well. *Hystories* raises important questions for skeptics, feminists, and those who consider themselves members of both communities.

Showalter also shows us that skepticism has roots in the humanities as well as in natural science. UFOlogists like to argue that the similarity among alien-abduction narratives indicates their truth; skeptics explain these by common psychological and social factors and stories spread by the media. A literary critic like Showalter also tends to explain such similarities as resulting from a common background story-template. Indeed, postmodern relativists are, in a sense, extreme skeptics: they claim even the theories of natural science are but stories with social and psychological roots. It is perhaps obvious to us that science is not just a story. But literary critics can help skeptics sort out when we can *appropriately* say common narrative features are not good evidence for the truth of a story. To be properly skeptical, we need to strike a balance, and the humanities, as well as science, can help us achieve this balance.

Hystories gets us thinking: about how skeptics might understand real emotional problems without making believers into demented loonies, about how much attention we should pay to our culture when trying to explain false beliefs, and, not the least, about how we can find allies in unexpected places. □



Confessions of an Ex-Parapsychologist

ROBERT A. BAKER

In Search of the Light: The Adventures of a Parapsychologist. By Susan Blackmore. Prometheus Books, Amherst, New York. 1996. 286 pp. ISBN 1-57392-061-4. Softcover, $16.95.

In this revised edition of her earlier book *The Adventures of a Parapsychologist* (Prometheus, 1986), Dr. Susan Blackmore, a CSICOP fellow, not only updates her continuing struggle to find positive evidence for the existence of extrasensory perception, or "psi," but also provides an entertaining "personal story of how an ardent believer in all things weird and wonderful put her own beliefs on the line and ended up having to change them." She also admits that in her search for a spiritual path she turned to the paranormal. She thought that it would help her understand the nature of consciousness and her own mind. She

refers to this as her "first mistake." Blackmore's candid account of her successes and failures in dealing with the world of the paranormal makes for fascinating reading.

Skeptics familiar with the earlier edition will find the new chapters and added material well worth their time and money. Readers unfamiliar with the earlier book should definitely read what is now recognized as "a classic" in the annals of skeptical literature.

Everyone teaching psychology has encountered numerous students expressing an interest in parapsychology and wanting explanations for their prophetic dreams, instances of apparent "mind reading," near-death and out-of-the-body experiences, encounters with ghosts and spirits, and life-after-death and reincarnation reports. Such students are seldom satisfied with the answers most professional psychologists provide. Young Susan Blackmore was typical of such students. She allowed her desire to understand the nature of memory, consciousness, and the self launch her on a lifelong search into the nature of psi and other human mystical experiences she refers to as "the light."

As a teenager, Blackmore read Rosalind Heywood's *The Sixth Sense* and at the age of twenty rejected her medical school placement to study psychology at Oxford and focus her attention on psychical research. Because of her dedication and diligence, as well as her intellectual brilliance, over the next eighteen years she managed to closely examine nearly every conceivable aspect of psychic theory, research, and practice, and in so doing meet and interact with the most prominent parapsychologists in England, Europe, and the United States. During the 1970s and 1980s, Blackmore worked closely with Ernesto Spinelli, John Beloff, Carl Sargent, William Braud, John Palmer, Mollie Goldney, Betty Markwick, Eric Dingwall, Brian Millar, and Robert Monroe, to mention a few.

Robert A. Baker is professor emeritus of psychology, University of Kentucky.

After gaining her Ph.D. in parapsychology from the University of Surrey, Blackmore did independent research in several areas of psi and attempted to replicate the work of parapsychologists who had claimed positive results. Motivated by her inability to find evidence of psi where others had, Blackmore was tempted to conclude, with many other skeptics, that the letters ESP stand for "Error Some Place." Sadly enough, Blackmore discovered flaws, errors of recording and tabulating, or procedural discrepancies in the work of every parapsychologist she investigated. In some instances, she even found fraud.

The book contains individual chapters on: why Spinelli was successful with finding ESP in children and she was not; so-called "fortune telling" with Tarot cards; her dashed hopes with Sargent's ganzfeld experiments; Markwick's analysis and explanation for Soal's apparent successes; her meeting with Croiset, the psychic, and his futile efforts to heal her; her disappointing personal experiences with out-of-the-body trips; her failure to find any poltergeists with her "Polty Box"; and her husband's pseudo "past-lives" experience. These stories are all tragicomical.

Her final essay on the power of belief and the depressing ease with which people can be deceived and deluded into believing in psi is particularly poignant. Her discussions of the Barnum effect, the illusion of control, people's inability to estimate probabilities, and other reasons people believe in weird things are well presented and a treat for skeptics.

Readers familiar with Blackmore's *Dying To Live* (Prometheus, 1993) will be intrigued by her chapter "The Failure of the Psi Hypothesis" and her discussion of mental models of reality. Skeptics following the famous 1985 ganzfeld debate, in which Ray Hyman's meta-analysis of forty-two studies led him to conclude that the better the quality of the study the smaller the psi effect, will be delighted to learn that Blackmore's independent analysis of this data agrees with Hyman's conclusions. Unsuccessful attempts to replicate psi are the norm, it seems. Since few (if any) American psychological journals accept reports with negative outcomes—especially in the taboo area of parapsychology—there is good reason to believe that the number of unpublished research studies failing to find evidence of psi is enormous. Selective reporting, also known as the "file drawer" effect, is something Blackmore stresses and is of profound significance in any argument concerning psi's existence.

Despairing of ever finding psi herself, Blackmore tells us that the more recent autoganzfeld studies (supposedly free of any and all experimenter effects), as well as new work on remote viewing, psychokinesis in living systems, and remote staring (the ability to tell when someone is looking at you), have all claimed positive results. In her words:

> Perhaps I should be convinced by all, or some of these. The trouble is that my experience teaches me not to be. Everywhere I have looked psi has seemed to slip away from me. And I cannot look everywhere.

She also admits that if she ever expects to find "the light" she will not do so by pursuing psi. Understanding the basis of mind, the nature of consciousness, or personal identity, she avers, in no way depends on or is related to the work of the parapsychologist. As for whether psi exists, she still hedges: "As for the paranormal, I still don't know."

This strikes me as a rather odd conclusion since there is, as of this date, no credible theory of psi, and the evidence against it is massive and, for most of us, thoroughly convincing. Psi is a case that should have been closed long ago. Yet the idea is so appealing to people that one can safely predict psi's case will never be closed. The paranormal is far more seductive than any group of sirens residing on the Rhine; and once seduced, its victims quickly become addicted to ways of wishful thinking that are almost impossible to change. Blackmore's story of how easy it is to be hooked and how difficult it is to escape is a cautionary tale not to be missed. □

Deception by Design

DAVID BLOOMBERG

Scams from the Great Beyond: How to Make Easy Money off of ESP, Astrology, UFOs, Crop Circles, Cattle Mutilations, Alien Abductions, Atlantis, Channeling, and Other New Age Nonsense. By Peter Huston. Paladin Press, Boulder, Colorado. 1997. ISBN 0-87364-912-5. 201 pp. Softcover, $20.

We all know that most skeptical books, if used in a rational, logical debate, would win the day against most New Age and other unscientific books. We also know that if we only had to be concerned about rational, logical debates, publications like SKEPTICAL INQUIRER would outsell the *Weekly World News*. Unfortunately, that isn't the way it works.

So, we have a number of rational, logical books that are often, let's face it, somewhat dry. Do I enjoy reading them? Absolutely! But I'd wager that I'm not the typical reader, and neither are most people reading this magazine.

Peter Huston, vice president of the Inquiring Skeptics of Upper New York, decided to do something about this, and *Scams from the Great Beyond* is the result.

Huston's book is modeled as a "how-to" book, telling readers how they can pretend to be a psychic, create fake UFO photographs, or write an astrology column. But it's quite obvious that this book is not here to teach fakery but to expose it. Many of his statements mesh with my own feelings. I've often thought I could make a lot of money, if only I could get rid of my conscience. Huston ends his introductory chapter by laying it all out on the table: "If you wish to join the ranks of the scum who use [dishonest] techniques to deceive, then there's no overwhelming reason why you can't be the next New Age guru or fraudulent psychic."

Some of the material, such as the discussion of cold reading, has been presented before by others. Huston even says as much in his final, most serious chapter. However, he has summarized that material into a lively, more readable (especially for nonskeptics) format.

He also adds some material that I had not thought much about before, such as the stranger aspects of advertisements for "psychics," including those who claim to be "psychic astrologers." He asks, "Aren't psychic phenomena and astrology two different things? Kind of like plumbers and electricians?" Indeed, if a person is truly psychic, why does he or she need to consult the stars? And if astrology actually works, why would an astrologer need to read your mind? It simply makes no sense.

When Huston discusses how to go about creating a reputation as a psychic, he hits upon several points about the way the media cover such phenomena. Since paranormal claims are often considered to be "human interest" or "fluff," reporters often spend little time trying to find out the facts. If the local "psychic" says she's found a missing boy's body, just write it up and you'll sell papers. After all, it doesn't matter whether or not it's true. The boy was found. The claim won't change anything. Thus, a reputation is born, and money rolls in for the "psychic."

Throughout the book, Huston makes his feelings for both the people who perpetrate this fraudulent nonsense, and the people who pay for it, quite obvious. He notes, "I may have left the casual reader with the impression that I consider the great bulk of New Age enthusiasts to be boneheads. This is absolutely correct." Later he adds, "if you think that you really can predict the future, then you should either see a doctor and get your head checked or else stop messing around with astrology buffs and invest in the stock market." Are such insults called for? Perhaps. How many of us have thought the same thing privately, while publicly biting our tongues for fear of offending anybody or appearing unprofessional? Obviously Huston doesn't share that fear, and while part of me wants to "shush" him, part of me cheers him for the truth of what he's said.

His final chapter, "But Seriously Folks . . . ," puts a fine point on everything he's said in the rest of the book. Paranormal claims are not just another form of "entertainment," as the media often portray them. I've often wondered why, when an elderly woman is robbed of her life savings by a con man using the time-honored pigeon drop, everybody says how horrible it is; but if the same woman slowly spends all her money on psychic readings and astrology charts, it's somehow considered "different."

A scam is a scam. The minds of others are not toys to be played with. The police are not around so some "psychic" can manipulate them for free advertising while taking up the time they could be spending looking for real clues. People should not be treated like sheep ready to be fleeced.

In writing this book, Huston has really shown the reader how to *avoid* being fooled. Perhaps its stylistic differences from most skeptical books will catch the eyes of those who might otherwise have missed this information. This is not to say it's a "dumbed-down" version of other books, but perhaps a "lightened-up" one. Huston has not necessarily targeted the readers of SKEPTICAL INQUIRER, as evidenced in his concluding paragraph: "My only hope is that the next time you see or hear of something extraordinary and unearthly, you'll view it in a slightly different way." He wants more people to be skeptical, and this book shows them why they should be. □

David Bloomberg is chairman of the Rational Examination Association of Lincoln Land (REALL), the Central Illinois local skeptics group. He works as an environmental engineer and can be reached at chairman@reall.org.

NEW BOOKS

Billions & Billions: Thoughts on Life and Death at the Brink of the Millennium. **Carl Sagan.** Random House, 201 East 50th St., New York, NY 10022. 1997. ISBN 0-679-41160-7. 241 pp. Hardcover, $24. This is a welcome posthumous book from Sagan. Completed only weeks before his death last December, it has some typically fascinating and provocative material, beginning with a self-mocking opening about the famous phrase (the book's title) Sagan insists he never uttered—but in the book he says it. He goes on to write of the powerful insights available to everyone from thinking quantitatively. He provides his perspective on four cosmic questions, including "Was There Ever Life on Mars?" (with a short discussion of questions raised last year about Martian meteorite ALH84001), and provides a useful update on all the recent discoveries of objects of planet-like mass around other stars. He then proceeds into some of his environmental, political, and social concerns. The final chapter, by Ann Druyan, movingly chronicles his illness and death. At the end, she notes how helpful the tremendous outpouring of warmth and support from people who mourned his loss has been to her and their children.

Heaven's Gate Cult Suicide in San Diego. **The Staff of the *New York Post*.** Harper Paperbacks, 10 East 53rd St., New York, NY 10022-5299. 1997. ISBN 0-06-101272-6. 333 pp. Paperback, $4.99. A "quickie book" journalistic account of the strange death and mysterious lives of the Heaven's Gate cult members. Ten chapters and an eight-page photo insert. Useful background for anyone writing on the subject.

A Skeptic's Guide to the New Age. **Harry Edwards.** Australian Skeptics Inc., P.O. Box A23324, Sydney South, NSW 2000. 1996. ISBN 0-646-24502-3. 429 pp. Paperback, $16.95 + $3 mailing and handling in U.S. Very useful book consisting of scores of short (mostly 2 or 3 pages) write-ups, by an experienced skeptical investigator, about New Age beliefs, concepts, and superstitions, separating the facts from "fads, fantasy, fiction, and fraud." Sample subjects include aromatherapy, auras, channeling, homeopathy, iridology, near-death experiences, psychics (by name and by specialties), reflexology, rolfing, spiritualism, therapeutic touch, and xenoglossy. With an afterword on dangers inherent in belief systems and three appendices.

Tools of Critical Thinking: Metathoughts for Psychology. **David A. Levy.** Allyn & Bacon, Needham Heights, MA 02194. 1997. ISBN 0-205-26083-7. 256 pp. Softcover [no price given]. This book about "thinking about thinking" is divided into six parts on conceptualizing phenomena, explaining phenomena, common misattributions (e.g, intervention-causation fallacy, consequence-intentionality fallacy, the "spectacular explanation" fallacy), investigating phenomena, other biases and fallacies in thinking, and conclusions. Its purpose is "to improve your thinking skills, to teach you to think critically, to help you think about thinking. . . ." The author's thought principles, or Metathoughts, are cognitive tools and, he hopes, "potent antidotes to thinking that is prone to be simplistic, lethargic, myopic, biased, flawed, or otherwise just plain sloppy."

UFO 1947–1997: Fifty Years of Flying Saucers. **Edited by Hilary Evans and Dennis Stacy.** John Brown Publishing Ltd., The Boathouse, Crabtree Lane, London SW6 6LU, England. 1997. ISBN 1-870870-999. 266 pp. Hardcover, £16.99. A *Fortean Times* book. A guide to fifty years of flying saucer and UFO reports, starting with the "eight days that shaped UFOlogy" in June/July 1947 and continuing case by case and decade by decade after that. A final section includes useful chapters on "Public Opinion Polls and UFOs" by Robert Durant, "The Force of Myth" by Marcel Delaval, "A Few Home Truths" by Jenny Randle, and "A Twentieth-Century Myth" by Hilary Evans.

Where Does the Weirdness Go? Why Quantum Mechanics Is Strange but Not As Strange As You Think. **David Lindley.** Basic Books, New York, NY. ISBN 0-465-06785-9. 1996. 251 pp. Hardcover, $24. An excellent overview of quantum mechanics that, as the title suggests, focuses on those aspects of quantum mechanics that strike most people as weird. The writing is nontechnical and entertaining, as well as informative. While Lindley does not discuss any paranormal claims, his book makes clear that quantum mechanics cannot be used as a license to "explain" ESP, psychokinesis, and the like.

—Terence Hines

Why People Believe Weird Things. **Michael Shermer.** W. H. Freeman and Co., 41 Madison Ave., New York, NY 10010. 1997. ISBN 0-7167-3090-1. 278 pp. Hardcover, $22.95. An excursion into "pseudoscience, superstition, and other confusions of our time," with sections on science and skepticism, pseudoscience and superstition, evolution and creationism, history and pseudohistory, and hope springs eternal, with its concluding chapter "Why Do People Believe Weird Things?" The science-historian author, head of the Skeptics Society, both explores our capacity for self-delusion and celebrates the scientific spirit.

—Kendrick Frazier

ARTICLES OF NOTE

Davidson, Keay. "Space Odyssey." *San Francisco Examiner Magazine*, June 1, 1997, 8–13, 21, 27. A lively, well-written, critical journalistic assessment of fifty years of flying saucers by a noted science writer. "A bleak anniversary for America's No. 1 pseudoscience. . . . Western genealogies are full of snake-oil salesmen, rainmakers, land speculators, pyramid schemers, gurus, and faith healers. And now, UFOlogists." He describes "the grandest—and, as we shall see, phoniest—of UFO fables": Roswell. Davidson describes the Project-Mogul-balloon-experiments explanation for the original Roswell report and how former believers Karl Pflock and Robert Todd now agree no saucer crashed in 1947. Nevertheless, says Davidson, in UFOlogy a new religion has been born. That UFO believers "are deluded is beside the point; the future may be theirs." Also contains a sidebar arguing strongly that the Kenneth Arnold sighting of nine flying objects over the Cascades on June 24, 1947, which started the modern UFO movement, was a breaking-up meteor/fireball.

Dorko, Barrett, and Neil I. Spilholz. "Outside of Science: Where Are the Data?" *Magazine of Physical Therapy*, March 1997, 60–62. Two physical therapists, in two separate pieces, strongly criticize proponents of "therapeutic touch" (TT) for providing no scientific evidence for their assertions of detecting and manipulating "energy fields" and for claims of healing based on TT. The authors call for basing practice on sound scientific principles and unequivocal evidence, none of which are evident regarding TT.

Fleck, John. "Roswell UFO Myths Crash into Reality." *Albuquerque Journal*, June 29, 1997, 1, 3, 4. After weeks of coverage of anecdotes of self-proclaimed "witnesses" to the Roswell "crashed saucer" events of July 1947 and advance stories about Roswell's fiftieth-anniversary UFO festivities, New Mexico's leading newspaper finally focuses on the question of whether the alleged saucer crash really happened. In this 70-column-inch report, science reporter Fleck tells the more skeptical side of the story, pointing out all the contradictions among various versions of the legend and recounting the views of Brandeis anthropologists Benson Saler and Charles Ziegler that the way the stories diverge over time rather than converge is "the pattern . . . of folklore and myth." Fleck also reports on the conversion to skepticism about Roswell of two prominent UFO investigators, Karl Pflock and Kent Jeffrey, who wanted badly to believe, but are now certain that no extraterrestrial craft crashed at Roswell in 1947. The event, Fleck quotes the Brandeis authors as saying, is "the folk narrative of an embedded culture."

Garlaschelli, Luigi, and Massimo Polidoro. "Testing a Miracle by Means of Tamper-Proof Containers." *Journal of the Society for Psychical Research* 61 (846): 314–317. January 1997. Report on the investigation of a purported macro-psychokinesis (PK) case, involving twenty-two-year-old Italian mystical "seer" Debora Moscogiuir. Providing her with a newly devised "tamper-evident" tube and allowing her to take it home to demonstrate the changes in it that she supposedly can accomplish psychically, the researchers discovered that "some crude tampering had occurred, and that this was indicative not of a miracle but, on the contrary, of some sort of fraud."

Gould, Stephen Jay. "Bright Star Among Billions." *Science* 275: 299. January 31, 1997. Eloquent tribute to Carl Sagan, "a fine scientist and the greatest popularizer of the 20th century, if not all time," criticizes the narrow-mindedness of much of the scientific community for downgrading "the long and honorable tradition of popular presentation of science." Gould hopes that the scientific profession will at last realize that "we as a profession can learn from you [Sagan] that the common touch enriches science and extends an ancient tradition that lies at the heart of Western humanism, and does not represent (when properly done) a journalistic perversion of the 'sound bite' age."

Gutierrez-Garcia, J. M., and F. Tusell. "Suicides and the Lunar Cycle." *Psychological Reports* 80: 243–50. 1997. The authors test the existence of lunar influence on the frequency of suicide by means of a permutation test. They analyzed 897 suicides reported by the Anatomical Institute of Madrid, using a strong testing method and accurate data on times of death. "Both factors provide firm ground for our conclusion: there appears to be no relationship between lunar phases and suicide."

Jaroff, Leon. "Did Aliens Really Land?" *Time*, June 23, 1997, 68–71. After providing a detailed elaboration of the Roswell story as told by UFO proponents and writers, veteran science editor Jaroff begins to point to all the contradictions: the dates, the minutes of a 1948 meeting of the Air Force Advisory Board that show how much the Air Force wished it had a saucer crash so it could discover "whatever they are," and other evidence that the real coverup has been on the part of credulous UFO believers. Recounts Project Mogul and the change to skepticism of two prominent UFO researchers, Kent Jeffrey and Karl Pflock. Ends by pointing out that the faithful will not be dissuaded by facts. "With the urge to believe so strong, the legend of Roswell will doubtless go on and on."

Klass, Philip J. "A Field Guide to UFOs." *Astronomy*, September 1997, 39–43. Much-needed recounting of all the natural explanations for UFO sightings—planets, stars, fireballs, birds, the moon—with specific cases of each cited. Solving a case can require a lot of rigorous investigation and sometimes some luck, Klass points out. Unfortunately, he says, nearly all the persons who now investigate UFO reports are eager to find "unexplainable" cases so that they can point to the lack of explanation as evidence of extraterrestrial spacecraft.

Levine, Art. "A Little Less Balance, Please." *U.S. News & World Report*. July 14, 1997, 56. "On Media" column states: "The Roswell 'mystery' is simple to explain: Many witnesses are telling false stories." Levine says the media have fallen victim to the weaknesses of "balanced reporting." He says when "one side of the debate consists of sheer hooey," as in this case, "balance" provides a distorted view of the truth and is a disservice to society. "A better approach to covering the Roswell story would be to focus on mounting evidence collected by more discriminating UFO researchers that many key Roswell witnesses, in the words of Kal Korff, aren't telling the truth."

Meeus, Jean. "Planetary Groupings and the Millennium: Why Panic?" *Sky & Telescope*, August 1997, 60–62. Astronomical groupings of planets have no significance for events on Earth, but Meeus presents his calculations of forty occurrences from A.D. 1 to 3000 when the Sun, Moon, and primary planets are within the same thirty degree span of celestial longitude. Meeus points out that even if all the planets were exactly in line with Earth and at their least possible distance to us, something that never happens, the combined planetary tide would equal only 1/6,460 [one part in 6,460] of the average tide due to the Sun.

Preston, Douglas. "The Lost Man." *The New Yorker*, June 16, 1997, 70–81. Fascinating article on perhaps "the most significant archaeological find of the decade"—the discovery in July 1996 near Kennewick, Washington, of a 9,300-year-old human skull exhibiting distinctly "Caucasoid" features. "What was a Caucasoid man doing in the New World more than ninety-three centuries ago?" Explores not only the scientific issues but the enormous political and legal sensitivities aroused by the find. The federal government—invoking the 1990 Native American Graves Protection and Repatriation Act—has confiscated the skull and prevented scholars from further examining it, even though if truly Caucasoid, the skull cannot likely be a direct ancestor of today's Native American tribal people.

Roush, Wade. "Herbert Benson: Mind-Body Maverick Pushes the Envelope." *Science* 275: 357–59. April 18, 1997. Research News profile of cardiologist Herbert Benson, who has championed the view that mental states greatly affect our physical well-being. This article considers the view of some supporters that Benson has recently gone too far, by saying that humans are "wired for God"—that believing in God can improve your health and is in fact an evolutionarily adaptive trait—and in sponsoring studies on "intercessory prayer."

Wild, Walter J. "Purveyors of the Paranormal." *Sky & Telescope*, August 1997, 10. Guest column laments the "many pseudo- and antiscientific claims espoused around the world—such as the recent deadly view that a spaceship was following Comet Hale-Bopp"—and contrasts this "dreamland approach to the world" with scientific skepticism and the scientific demand for proof. Calls on scientists to do more to disseminate "both scientific reality and scientific reasoning to the public."

—Kendrick Frazier

FRINGE-WATCHER

from page 17

that every integer is the sum of no more than 19 fourth powers. The smallest number requiring 19 such powers is 79, the sum of four fourth powers of 2 and fifteen fourth powers of 1. The repeating decimal of 1/19 is the 2 × 9 = 18-digit number 052631578947368421. Multiply it by any number from 2 through 18 and the product has the same 18 digits in the same cyclic order. Multiplying by 19 produces a row of 2 × 9 = 18 nines.

The Constitutional Amendment giving women the vote was the 19th. The 19th hole in golf is the bar where golfers sink drinks like they sink puts in 18 holes. Every 19 years all phases of the moon fall on the same days of the week throughout the year. The Psalms is the Bible's 19th book. Psalm 19 opens with "The heavens declare the glory of God, and the firmament showeth his handiwork."

The numbers most often encountered in the Bible are 12 and 7. They are reflected in our calendar, with its seven days to a week and twelve months to a year. The sum of the two numbers is 19.

Figure 1 on page 17 reproduces a thing of strange beauty. The nineteen cells hold integers 1 through 19. Every straight row of cells adds to 38, or twice 19. It would make a wondrous amulet for the Baha'is. □

CSICOP 20th Anniversary Conference

"Science in the Age of (Mis)Information"

SESSION TAPES First World Skeptics Congress

Qty	Session#	Session Title	No. of Tapes	Price Per Session	Session Total
	1	Opening/Welcoming Remarks	1	$7.95	
	2	Role of the Media in (Mis)Informing the Public	2	$15.90	
	3	CONGRESS ADDRESS—Leon Lederman	1	$10.00	
	4	The Growth of Anti-Science	2	$15.90	
	5	CONGRESS LUNCHEON—Chris Carter, creator of *The X-Files*	1	$10.00	
	6	UFOlogy	1	$7.95	
	7	Astrology	1	$7.95	
	8	Homeopathy	1	$7.95	
	9	Therapeutic Touch	1	$7.95	
	10	Chiropractic	1	$7.95	
	11	Creation/Evolution	1	$7.95	
	12	KEYNOTE ADDRESS—Stephen Jay Gould	2	$20.00	
	13	Parapsychology: Recent Developments	2	$15.90	
	14	CFI LUNCHEON—Sir John Maddox	1	$10.00	
	15	Mechanisms of Self-Deception	1	$7.95	
	16	Alternative Health Cures	1	$7.95	
	17	Philosophy and Pseudoscience	1	$7.95	
	18	Psychoanalytic Theory and Therapy	1	$7.95	
	19	Critical Thinking in Education	1	$7.95	
	20	Spiritualism, the UB Exposé	1	$7.95	
	21	The Paranormal in China	1	$7.95	
	22	AWARDS CEREMONY AND ENTERTAINMENT (Steve Allen)	1	$10.00	
	23	World Skeptics Update	3	$23.85	
		COMPLETE SET		**$242.85**	
		TOTAL ORDER			

❑ Bill me ❑ Check or money order enclosed Charge my ❑ MasterCard ❑ Visa

Card # _____ Exp. _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

Please make checks payable to CSICOP and return to:

CSICOP
P.O. Box 703
Amherst, NY 14226-0703

Credit card orders may call toll-free 1-800-634-1610 or FAX (716) 636-1733

FILL IN THE GAPS IN YOUR Skeptical Inquirer COLLECTION

• 15% discount on orders of $100 or more •

• $6.25 a copy, Vols. 1-18 ($5.00 Vols. 19, 20, 21). To order, use reply card insert •

JULY/AUGUST 1997 (vol. 21, no. 4): Special Report: Heaven's Gate, *Kurtz, Gardner, Nickell* / What really happened at Roswell, *Korff* / Amazing free-energy claims of Dennis Lee, *Krieg* / Chiropractic: Science, antiscience, pseudoscience, *Keating* / Secrets of a Russian psychic, *Polidoro.*

MAY/JUNE 1997 (vol. 21, no. 3): Is the sky falling?, *Morrison* / Collective delusions: A skeptic's guide, *Bartholomew* / Scientific reasoning and achievement in a high school English course, *Kral* / Skepticism and politics, *Fagin* / Courtney Brown's 'Cosmic Voyage' into preposterism, *Gardner.*

MARCH/APRIL 1997 (vol. 21, no. 2): The darkened cosmos: A tribute to Carl Sagan / Hale-Bopp comet madness *plus* An astronomer's personal statement on UFOs, *Hale* / Biases of everyday judgment, *Gilovich* / The end of science?, *Schick* / *The Book of Predictions:* 15 years later, *Tuerkheimer and Vyse* / Farrakhan, Cabala, Baha'i, and 19, *Gardner.*

JANUARY/FEBRUARY 1997 (vol. 21, no. 1): *The X-Files* meets the skeptics: Chris Carter takes questions / The significance of the millennium, *Loevinger* / Quantum quackery, *Stenger* / The mysterious placebo, *Dodes* / Bias and Error in children's books, *Wiseman and Jeffreys* / Jean Houston: Guru of human potential, *Gardner.*

NOVEMBER/DECEMBER 1996 (vol. 20, no. 6): A strategy for saving science, *Lederman* / That's entertainment! TV's UFO coverup, *Klass* / Scientific consensus and expert testimony, *Moore* / The Dogon people revisited, *Ortiz de Montellano* / Cosmic menagerie, *Tyson* / Physicist Alan Sokal's hilarious hoax, *Gardner.*

SEPTEMBER/OCTOBER 1996 (vol. 20, no. 5): Shades of meaning: Science fiction as a new metric, *Stewart* / The first World Skeptics Congress / Traditional medicine and pseudoscience in China, part 2, *Beyerstein and Sampson* / Conspiracy theories and paranoia, *Harrington* / Isaac Newton, *Gardner.*

JULY/AUGUST 1996 (vol. 20, no. 4): Traditional medicine and pseudoscience in China, *Beyerstein and Sampson* / CSICOP at twenty, *Kurtz* / Maria's near-death experience, *Ebbern, Mulligan, and Beyerstein* / Alternative health education and pseudocredentialing, *Raso* / Pentagon grant funds alternative health study, *Selby and Scheiber* / Thomas Edison, Paranormalist, *Gardner.*

MAY/JUNE 1996 (vol. 20, no. 3) Delights and dangers of sensory illusions, *Wolf* / The enigmatic battery of Baghdad, *Eggert* / The claims of aromatherapy, *McCutcheon* / Fun and fallacies with numbers, *Savant* / A study of fantasy proneness in John Mack's *Abduction, Nickell* / The great egg-balancing mystery, *Gardner.*

MARCH/APRIL 1996 (vol. 20, no. 2) Science and superstition, *Sagan* / Special report: Evaluation of military's program on psychic spying, *Hyman* / The role of representativeness in erroneous and pseudoscientific beliefs, *Gilovich and Savitsky* / Vampires of folklore and legend, *Barber* / Miracle photos *Nickell* / Claiborne Pell: Senator from outer space, *Gardner.*

JANUARY/FEBRUARY 1996 (vol. 20, no. 1) How to make an alien for autopsy, *Stokes* / EMDR treatment, *Lilienfeld* / Psychic crime detectives, *Wiseman, West, and Stemman* / Health statistics bad for our health, *Paulos* / Science and reason in film and television, *Evans* / Post-Freudian dream theory, *Gardner.*

NOVEMBER/DECEMBER 1995 (vol. 19, no. 6) The GAO report on Roswell, *Klass* / Why creationists don't go to psychic fairs, *Taylor, Eve, and Harrold* / Eyewitness testimony and the paranormal, *Wiseman, Smith, and Wiseman* / Objectivity and repeatability in science, *Mussachia* / Culture-bound syndromes as fakery, *Bartholomew* / Freud's theory of dreams, *Gardner.*

SEPTEMBER/OCTOBER 1995 (vol. 19, no. 5) The paradox of knowledge, *Loevinger* / Consciousness as a valid subject for science, *Ingalls* / School daze: review of African-American baseline essays, *Rowe* / Mystical medical alternativism, *Raso* / China, chi, and chicanery, *Huston* / Fuzzy logic, *Gardner.*

JULY/AUGUST 1995 (vol. 19, no. 4) How to sell a pseudoscience, *Pratkanis* / Rumors, self-fulfilling prophecies, and national obsessions, *Paulos* / Rose Mackenberg, *Pankratz* / Moon, planets, and disasters, *Branham* / Artificial languages, *Gardner* / The Roswell incident and Project Mogul, *Thomas.*

MAY/JUNE 1995 (vol. 19, no. 3) The belief engine, *Alcock* / Is skepticism tenable? *Beloff plus Blackmore, Hyman, Kurtz, Alcock, and Gardner* / Mediumship, *Stein* / Ancient aluminum, *Eggert* / Crop circle mania wanes, *Nickell* / Doug Henning and TM, *Gardner* / A young Grand Canyon? *Heaton.*

MARCH/APRIL 1995 (vol. 19, no. 2) Remembering dangerously, *Loftus* / Antiscience in academia, *Gross and Levitt* / Feminism now alienating women from science, *Koertge* / 'Lights out': A faxlore phenomenon, *Brunvand* / Critique of evolution study, *Larhammar.*

JANUARY/FEBRUARY 1995 (vol. 19, no. 1) Wonder and skepticism, *Sagan* / Putting away childish things, *Dawkins* / The astonishing hypothesis, *Crick.* / Nuclear medicine, *Seaborg* / Literary science blunders, *Gardner* / Air Force report on the Roswell incident / 1994 CSICOP Conference.

FALL 1994 (vol. 18, no. 5): Empirical evidence for reincarnation? / Reader's guide to the ozone controversy / Bigfoot evidence: Are these tracks real? / Why we are unmoved as oceans ebb and flow / Anomalous phenomena in Kazakhstan / False memories.

SUMMER 1994 (vol 18, no 4.): 'Extraordinary science' and the strange legacy of Nikola Tesla / Nikola Tesla: Genius, visionary, and eccentric / Pollens on the 'Shroud': A study in deception / Do televised depictions of paranormal events influence viewers' beliefs? / Synchronicity and the archetypes / The synthetic mind clashes with the reductionist text / Psi in pyschology.

SPRING 1994 (vol. 18, no. 3): The Antiscience Threat: The growth of anti-science / The antiscience problem / Measuring the prevalence of false memories / Bleuler's views on inheritance of acquired characteristics and on psi phenomena / Examining the satanic panic: A personal perspective . . . A sociological and historical perspective / Philosophy and the paranormal, Part 2: Skepticism, miracles, and knowledge.

WINTER 1994 (vol. 18, no. 2) The new skepticism / Philosophy and the paranormal, Part 1: The problem of 'psi.' / Electromagnetic field cancer scares / Attacks on role-playing games / Global fortune-telling and Bible prophecy / Chernikov pattern puzzle.

FALL 1993 (vol. 18, no. 1): 'Perspectives on education in America': Sandia study challenges misconceptions / Do 'honesty' tests really measure honesty? / Astrology strikes back—but to what effect? / Diagnoses of alien kidnappings that result from conjunction effects in memory / Mathematical magic for skeptics / The blind girl who saw the flash of the first nuclear weapon test / Science: The feminists' scapegoat?

SUMMER 1993 (vol 17, no. 4): The right hemisphere: An esoteric closet? / Improving science teaching: The textbook problem / The eyewitness: Imperfect interface between stimuli and story / Pathological science: An update / Jack Horkheimer, 'Star Hustler,' interview / The false memory syndrome.

SPRING 1993 (vol 17, no. 3): Anguished silence and helping hands: Autism and facilitated communication / Facilitated Communication, autism, and Ouija / Treading on the edge: Practicing safe science with SETI / Education for science / A threat to science / Charles Honorton's legacy to parapsychology / 1993 CSICOP Conference.

WINTER 1993 (vol 17, no. 2): Special report: 3.7 million Americans kidnapped by aliens? / Psychics: Do police departments really use them? / Psychic detectives: A critical examination / Therapeutic touch. / Improving science teaching in the U.S / The Big Sur 'UFO' / The strange case of the New Haven oysters.

FALL 1992 (vol 17, no 1): A celebration of Isaac Asimov: A man for the universe, *Kendrick Frazier, Arthur C. Clarke. Frederik Pohl, Harlan Ellison, L. Sprague de Camp, Carl Sagan, Stephen Jay Gould, Martin Gardner, Paul Kurtz, Donald Goldsmith, James Randi, and E. C. Krupp* / Gaia without mysticism / Gaia's scientific coming of age / The curse of the runestone: Deathless hoaxes / Night terrors, sleep paralysis, and devil-stricken telephone cords from hell / Scientific creationism: The social agenda of a pseudoscience / Observing stars in the daytime: The chimney myth / Does an ancient Jewish amulet commemorate the conjunction of 2 B.C.?

SUMMER 1992 (vol. 16, no. 4): Freedom of scientific inquiry under siege / Psychic experiences: Psychic illusions / The scientist's skepticism / The persistent popularity of the paranormal / Self-help books: Pseudoscience in the guise of science?

SPRING 1992 (vol. 16, no. 3): Special Report: The Maharishi caper: *JAMA* hoodwinked / Myths of subliminal persuasion: The cargo-cult science of subliminal persuasion / Subliminal perception: Facts and fallacies / Subliminal tapes / The Avro VZ-9 'flying saucer' / Two 19th-century skeptics: Augustus de Morgan and John Fiske.

WINTER 1992 (vol.16, no.2): On being sued: The chilling of freedom of expression / The crop-circle phenomenon / Update on the 'Mars effect' / A dissenting note on Ertel's 'Update' / Magic Melanin: Spreading scientific illiteracy among minorities, Part 2 / Adventures in science and cyclosophy / Searching for security in the mystical.

FALL 1991 (vol. 16, no. 1): Near-death experiences / Multicultural pseudoscience: Spreading scientific illiteracy, Part 1 / Science and commonsense skepticism / Spook Hill / Lucian and Alexander / 1991 CSICOP conference.

SUMMER 1991 (vol. 15, no. 4): Lucid dreams / Nature faking in the humanities / Carrying the war into the never-never land of psi: Part 2 / Coincidences / Locating invisible buildings / True believers.

SPRING 1991 (vol. 15, no. 3): Special report: Hi-fi pseudoscience / Searching for extraterrestrial intelligence: An interview with Thomas R. McDonough / Getting smart about getting smarts / Carrying the war into the never-never land of psi: Part 1 / Satanic cult 'survivor' stories / 'Old-solved mysteries': The Kecksburg incident / Magic, medicine, and metaphysics in Nigeria / What's wrong with science education? Look at the family.

WINTER 1991 (vol. 15, no. 2): Special report: Gallup poll: Belief in paranormal phenomena / Science and self-government / West Bank collective hysteria episode / Acceptance of personality test results / Belief in astrology: A test of the Barnum effect / A test of clairvoyance using signal-detection / Intercessory prayer as medical treatment?

FALL 1990 (vol. 15, no. 1): Neural Organization Technique: Treatment or torture / The spooks of quantum mechanics / Science and Sir William Crookes / The 'N' machine / Biological cycles and rhythms vs. biorhythms / 1990 CSICOP Conference.

For a complete listing of our back issues, call 800-634-1610.

Is the Sky Falling?

It was amusing to read David Morrison's article "Is the Sky Falling?" in the May/June 1997 issue. His literature search parallels the *National Inquirer* or *Weekly World News* by scaring the public about a bogus impending catastrophic event of an asteroid crashing into Earth. He even included a painting showing a huge asteroid impacting Earth (courtesy of NASA and the U.S. taxpayer).

NASA has been on the budget cut block for the past decade. After the Challenger accident and the Hubble telescope multibillion-dollar fiasco, NASA has had serious problems selling Congress on the its multibillion-dollar government welfare program for starving Ph.D. nerds. Now, it seems that NASA's latest scam is to use fear to scare the taxpayers into forking over billions of dollars into its "Spaceguard" program to scan the heavens to prevent an asteroid disaster.

Morrison even quantifies the average risk of death for each individual on Earth to "nearly one in a million per year." I am curious how this number was calculated, since not one asteroid death has ever been reported.

Robert H. Gough
Milpitas, Calif.

I am quite concerned about the public's perception of the K-T impact and effects. As a devotee of neither impact nor non-impact camps, I find there is ongoing scientific dispute relating to specific impact-event "facts," their local and global significance, and, most important, any bearing on K-T extinctions. Since I am no expert on these controversies, I will confine my comments to a subject about which I know even less, sociology.

Several sociologic aspects of the K-T impact hypothesis have raised skeptical hackles on my neck:

1) Catastrophism provides convenient, simple explanations of phenomena that can be easily grasped by an unsophisticated public. This smacks of "wrath of Gods" explanations.

2) The impact model provides a too convenient combination of modern social touchtones, including dinosaurs, species extinctions, "space—the final frontier," comets or meteors as omens, life and death catastrophes, nuclear winter, global climate change, and even a Nobel scientist.

3) Rapid media acceptance insured that the first group convinced of this hypothesis were kids, who now know why Barney and T-Rex went extinct. It is likely that those least convinced of this hypothesis are paleontologists (evidence of ten- to hundred-thousand-year extinction histories across the K-T transition).

Least controversial is Morrison's main thesis, that there is "scientific consensus" that "cosmic impacts played a major role in Earth history." About the rest, I've still got more questions than answers.

Alan E. Williams
Inst. of Geophysics
and Planetary Physics
Univ. of Calif., Riverside

I wish to note two cases of apparent overstatement in David Morrison's otherwise excellent article on the potential for asteroid impact.

First, Morrison states, "Impacts are the ultimate environmental disasters, more important than volcanic eruptions or other more familiar events in shaping the history of life on the planet." Unless he is referring to the speculation by some geologists/paleontologists of repeated major "erasures" of early life caused by impacts during the early heavy bombardment, on the order of more than 3,500 million years ago, I am unclear as to what he is referring. With the exception of the K-T extinctions, I am aware of no confident linking of a mass extinction to an impact event. Such impacts, without doubt, have the potential to shape the development of life on Earth, and appear to have done so at least once, but extrapolating to assign them the dominant role in the development of life, based on a sample size of one, appears excessive. I know of no clear evidence linking impacts to either of two of the most significant events in the development of multicellular life on this planet, namely the Cambrian "explosion" and the most severe mass extinction recorded, at the end of the Permian.

Second, the accompanying illustration ("Artist's concept of a catastrophic impact . . .") struck me as grossly exaggerated. I doubt that an impactor on the order of the K-T event asteroid would be such a large naked-eye object on a scale showing so much of the Earth's curvature. Some simple calculations from the circumference of the Earth visible in the illustration suggests that the impactor in the figure is approximately 7 percent of Earth's diameter, or roughly 890 km. That is more than fifty times larger than the 1- to 15-km impactors discussed in the article, and is comfortably larger than Ceres, the largest asteroid (785 km), and about half of the 1,738-km diameter of Luna. Such an impact would be truly catastrophic, but as a nonastrophysicist, I suspect the probability that a body of that size exists in the solar system in an orbit that could one day intersect Earth's is essentially zero.

Ken Keay
Norton, Mass.

David Morrison's disparaging remarks on the coherent catastrophism espoused by Clube and Napier and coworkers are not warranted. Morrison lauds *Hazards Due to Comets and Asteroids*, edited by Tom Gehrels, but neglects to mention that Clube and coworkers are contributors.

Morrison fails to distinguish properly between the stochastic model, marked by random hard impacts of 1-km objects on a time scale of 100,000 years, and Clube and Napier's model, in which the main threat is from aerial detonations of multiple-Tunguskas (and larger) in a flux of massive fireball storms. These occur in clusters, over 1,000 to 2,000 years, when the orbital evolution of a meteor stream, such as the Taurid complex, results in a temporary (century or two) nodal intersection with Earth's orbit. This behavior can arguably be called "the dynamics of armageddon." The differences between the models and the uncertainties in both the lunar cratering record and the current Near-Earth Object population at all energy levels are such that the coherent model cannot be discounted.

Clube and Napier's many publications present evidence that the evolution of the Taurid complex and its parent comet has been a major factor during the Holocene, contributing to major climate reversals and influencing the development of civilization and religion. At one time, the Taurid complex contained visible bodies considered to

be gods. In *The Cosmic Winter*, Clube and Napier note: "Catastrophes of this sort, delivered by visible celestial gods, are completely outside modern experience, but it is clear that they could have been a major reason for the preoccupation with, and dread of, the sky manifested by the earliest civilizations."

Finally, Morrison's commentary is marred by three minor errors: (1) The "now-famous paper published in *Science* . . . by Luis and Walter Alvarez and their colleagues" was in 1980, not 1981. (2) Gerrit Verschuur is not British, but a U.S. citizen born in South Africa of Dutch parents. (3) While I appreciate Morrison's noting my defection from Velikovsky to Clube and Napier, I regret to say I am not one of "many people" who did so. My conversion, as explained in my "A Lesson from Velikovsky" (*SI*, Summer 1986, 380–381), is rare. An updated account titled "An Antidote to Velikovskian Delusions" from *Skeptic* 3:4 (1995) can be found at http://abob.libs.uga.edu/bobk/velidelu.html.

C. Leroy Ellenberger
St. Louis, Mo.

Shame on SKEPTICAL INQUIRER for missing the opportunity to dispel the myth of K-T impact!

In David Morrison's article, plenty of space is given to the debunking of silly claims that Earth is at great risk from bombardment by a meteorite as large as the one that supposedly wiped out the dinosaurs at the K-T boundary (the boundary between the dinosaur-dominated Cretaceous Period and the dinosaur-less Tertiary Period). Unfortunately, no space is given to the debunking of the error that started all the meteorite hubbub: the mistaken idea that there was a K-T meteorite impact in the first place.

The iridium spike at the K-T boundary has been interpreted as evidence of meteoritic impact by some researchers (e.g., Alvarez et al., whose 1980 paper introduced the K-T impact theory). However, volcanic activity can also result in iridium deposition, and much evidence points to volcanism as the source for the K-T iridium spike. . . .

Incidentally, extended volcanism has also been implicated in mass extinctions other than the K-T, including the more devastating Permo-Triassic extinction (R. A. Kerr, *Science* 270: 27-28).

The ecological effects of the impact of a kilometers-wide meteorite with Earth remain unknown, since such an event has never been observed by humans. Therefore, the catastrophic, post-impact ecological effects postulated by Alvarez et al. are hypothetical only, and should not be unquestionably accepted.

The K-T impact scenario is an attractive theory. It is exciting to have the dinosaurs killed off by a cosmic catastrophe, and the theory provides an easy answer to a difficult question: What killed off the dinosaurs? Unfortunately, when easy and exciting answers are not researched thoroughly, error can result.

Phil Senter
Department of Biology
Baylor University
Waco, Tex.

David Morrison replies:

Thanks to readers Keay, Gough, and others for noting the inappropriate nature of the illustration and caption. I did not know this illustration was being used until I received the printed journal. I keep a copy of this painting on my wall to remind me of the much larger impacts Earth received in the first 500 million years of its history—impacts great enough to boil away the oceans and sterilize the planet. But these have nothing to do with "impact winter" or "nuclear winter," or even with large mass-extinction events like the K-T impact, which are energetically about 10,000 times smaller than the impact shown in the painting.

Readers Gough, Williams, and Senter question the reality of the K-T impact and even the motivations of the scientists in many disciplines who pursue these issues. They are entitled to their opinions, but I had hoped they and other readers would familiarize themselves with the technical literature on the subject before jumping to conclusions. Good starting points would be the volume Hazards Due to Comets and Asteroids, *edited by Tom Gehrels, or other references to be found at NASA's impact hazard Web site (http://impact.arc.nasa.gov.). Also, Gough should note that the proposed Spaceguard budget of five million dollars per year is less than 0.04 percent of NASA's budget—there really is a difference between "millions" and "billions"! One of my objectives in writing this brief overview was to point out to readers that the historic role of impacts in evolution and the current risk they pose are serious topics of contemporary research, but apparently this message was lost on these three letter writers.*

In reply to Keay's questioning of whether impacts are "the ultimate environmental disasters," this statement is not based on the K-T or any other historical impact, but rather on the presence in near-Earth space of comets and asteroids that will pack a terrible punch when they hit Earth, as many of them must eventually do. The collisional energy of Comet Hale-Bopp, for example, would be about ten times that of the K-T impact. It is easy to see that these explosive energies, and the way they affect the environment, dwarf any possible volcanic or other endogenic (internal) terrestrial catastrophes. In reply to Ellenberger, I can only say that most astronomers and geoscientists find the evidence presented by Clube and Napier concerning the historical (and pre-historical) influences of the Taurid complex to be less than convincing. Presumably further research will help indicate whether the current danger is roughly as I have depicted or hundreds of times greater, as they infer from their interpretation of ancient sources.

Finally, I should add a comment on the recent press interest in a paper given by Lou Frank at the American Geophysical Union meeting in May. Frank reported a flux of small comets hitting Earth at a rate approximately one million times greater than would be inferred from other evidence. Even if Frank is correct, his mini-comets are not relevant to the impact risk I discussed. Since these objects must be invisible to ordinary telescopes, they must not create craters even when they strike the airless Moon, and they must deposit little if any energy in the atmosphere or else they would be seen by the many surveillance cameras operated by the USAF Space Command. If they were real, material objects, they would be easily detected by any of these means. For example, the space surveillance data indicate a Hiroshima-size atmospheric explosion every few months, while Frank's mini-comets would cause such an impact flash once every few minutes. Clearly something is wrong here, and I advise skepticism until the issue is further debated by the experts.

Readers React to 'Skepticism and Politics'

Readers' hot-button topic in the May/June issue was the article "Skepticism and Politics." We received thirty-five letters. Most were critical of the article itself, critical of us for publishing it, or both. Representative exerpts appear below. We had considered the article to be a mostly even-handed preliminary exploration of how skeptics might approach their political responsibilities, but many saw it as an inappropriate subject for our pages and a thinly disguised pitch for libertarianism. For the record, SKEPTICAL INQUIRER has no political agenda or viewpoint.

—The Editor

Was the inclusion of a one-sided, partisan diatribe ("Skepticism and Politics" by Barry Fagin, May/June 1997) in a magazine that promotes skeptical thought intentional or merely a horrible mistake? In his article, Fagin freely admits that he is an active libertarian, albeit only after leading the reader all the way down the proverbial garden path. Along that path, however, he indulges in several, less obvious propaganda devices.

Let us unpack our "baloney detection kits" as Carl Sagan advised in *The Demon-Haunted World* and ask the following questions. In how many places does he sneak in an unsupported conclusion as a fact (e.g., history shows that government is not effective in helping the poor)? How many weasel words can one find, such as *suggest* in reference to a theory that allegedly "generates testable predictions"? How many times does Fagin knock down a straw man, such as in his imaginary debate with an archetypal liberal?

Public choice theory, also called rational choice theory, is frequently used by those on the right of the political spectrum to prop up their positions. When Fagin mentions two books on public choice theory as mandatory reading for skeptics, does he, in consideration of alternate explanations, also provide a reference to any work that refutes this theory such as *Pathologies of Rational Choice Theory*, by Donald Green and Ian Shapiro?

Mr. Fagin presumptuously concludes that there are only three possible courses of action for the politically active skeptic. He instructs us that we should either support the Libertarian Party or, to paraphrase, strive to bring the two major parties more in accordance with libertarian ideology!

The application of skeptical thinking will not inexorably lead one to adopt libertarian positions anymore than, as Rush Limbaugh incessantly cries, the application of "common sense" will lead one to adopt his mainly Republican positions. I respect Fagin's right to express his political beliefs in some other forum. However, I do not respect the notion that we, as skeptics, must reach the same conclusion.

Robert A. Wise
Monroeville, Pa.

If a healthy and uncompromising skepticism is necessary for making sound political judgments, so also is a willingness to consider all the evidence. Barry Fagin says that certain government activities "are likely to have unintended consequences, precisely *because* government is involved" (my emphasis). But there are unintended consequences to all human activity, particularly economic activity. Government is the price we pay for economic freedom. It is a countervailing force, a watchdog, if you will, and an ameliorating agent against such unintended consequences (and we must assume they are unintended) as environmental degradation, economic dislocation, the disappearance of jobs, inequitable access to services, and so on.

I am much more concerned about the power inherent in great wealth and concentrated economic strength, over which I have no control, than I am about the power of government, over which I have some control. If government is imperfect, then we should make it better. (Did someone whisper campaign reform?) It's a complicated world out there and we need to keep an eye on it.

In setting out our choices for political action, Fagin has limited them to those that reflect his particular bias. Mine is that government can be, and often has been, an effective tool for improving people's lives, and that its shortcomings are demonstrably those of throwing a life preserver halfway to a drowning man and telling him to swim the rest of the way. In the interest of more responsive government, after visiting the World Wide Web home pages that Fagin suggested, try surfing over to www.newparty.org for another point of view.

And now, will all those in favor of getting back to psychic phenomena please raise your hands!

Ramona Matthews
Silver Spring, Md.

Contrary to what Barry Fagin imagines, government is extremely effective as a social tool. Anytime a group of people have to live together, share resources, and somehow get along, a government of sorts will arise to establish common understandings and behaviors. Whether the government functions for the common good depends on the level of democracy attained. A benign dictator is a contradiction in terms.

Since I am now older than dirt, I have experienced the progression of government from do-little to do-much. I like the do-much version better and would like to see do-more. As a result of do-much government, I have seen the condition of the elderly go from the most wrenching poverty to comfort. I have seen massive increases in home ownership and educational levels. I have seen people ride out spells of unemployment successfully where before they faced economic ruin. I have seen jobs created where the private sector was unable to do so. I have seen people go from being victimized by the marketplace to being protected from the ripoff artists in finance, healthcare, housing, foods, drugs, and consumer services galore. I have seen the death and destruction caused by natural disasters mitigated by the U.S. Corps of Engineers' projects and by Weather Service forecasts. I have seen infrastructure developed that connects our huge nation for the benefit of commerce as well as individuals. I have seen advances in science that have improved our lives in many ways.

Fagin is right when he says that "Self-interest is dominant in all human affairs, both public and private." It is in my self-interest (and I'm sure Fagin's) to have a society where the basic needs of everyone are met, where everyone is assured adequate healthcare, education, and jobs, where no one is allowed to harm, exploit, or discriminate against another. We have tried the libertarian approach. That's been the standard worldwide for thousands of years. All it produced were small ruling classes that had everything because they exploited huge numbers of powerless people who had nothing. The powerless people accepted

that as the way the world worked. They have now found out it does not have to work that way, so there's no going back. We share this world and its resources equitably, or we pay the price in civil strife.

Marie Alena Castle
Minneapolis, Minn.

Barry Fagin must have a good sense of humor, being a government employee as well as a libertarian. His attack on the FDA is also true of the United States Air Force, his employer (i.e., they "act to increase their budget and regulatory authority far beyond that which was originally intended").

His personal choice model is a little scary when his medical care is covered by the taxpayers. Should he be allowed to make his own choice between penicillin or a crystal if he has a sore throat? (I hope his salary isn't high enough to do his own drug research.)

I also fail to see the relationship between the FDA and faith healing, which he used as an example of an unneeded FDA. Anybody who wants to use faith healing can. It's never been banned by the FDA, but your insurance company won't pay for it. Laetrile is something else again, a harmful drug that both you, your doctor, and your pharmacist should know is not endorsed. (Hmmm, wonder why he didn't use thalidomide as an example?)

I'd also like to see what "historical evidence" he is using here to show that, "government is not effective tool for improving the lives of the poor in any meaningful sense." How does he define "meaningful sense?" Isn't it meaningful not to starve in the street? Unfortunately, values are determined socially not scientifically.

It's easy to demolish others, e.g., political scientists, bureaucrats, liberals, and conservatives, but this is insultingly unscientific. Skeptics can and should contribute clear thinking whenever possible to aid in us make political choices, but Fagin's choices amount to "I got mine, why should I worry about yours."

Barbara Schnelker
San Diego, Calif.

Barry Fagin states that ". . . [s]keptics, in fact, may hold widely differing values." Mr. Fagin's got that right. I won't delve unduly upon the irony of someone seeing the government as a failure while also working at a military academy. But I will remind your otherwise fine publication that, if your readers wish to read libertarian propaganda, they can do so by going directly to the source. Thinly disguised political tracts don't belong in the SKEPTICAL INQUIRER.

Serge Mailloux
Concord, Calif.

The article "Skepticism and Politics" shows that it is not easy to apply skepticism. Fagin is inconsistent. He asks whether the term *political science* can really be said to have any meaning at all, and then endorses the theories of James Buchanan as a guiding principle for understanding political behavior. . . .

Fagin is bothered by the fact that there are no perfect answers in the social sciences. Just because you cannot eliminate a problem does not mean that you should not seek to ameliorate it. . . . Perhaps the cartoonist Tom Tomorrow answered this concern best:

"You know why we should eliminate welfare Wanda? Because it's been a complete failure. After all . . . there are still poor people!

"Hey Good thinking Biff! And while we're at it, why don't we eliminate the Fire Department? After all . . . there are still fires! And talk about failures . . . what about the medical industry? Why there are still sick people everywhere you look! And why don't we shut down the police department as well—since there are still criminals! For that matter, why have any laws at all. People still break them all the time!"

A role of skepticism in politics is to seek information on what problems can be usefully attacked. It is not at all clear that the blanket mistrust of government evinced by libertarians is the "skeptics" position in this regard.

Robert Clear and Barbara Judd
Berkeley, Calif.

Barry Fagin raises some interesting questions but unfortunately fails to provide real answers. This is because he begs some crucial questions, relies on brute assertion to settle others, and depends on controversial conclusions derived from certain economic theories. In spite of his insistence on skepticism, Fagin has produced little more than an article-length advertisement for his right-wing political cause.

Most significantly, Fagin fails to consider that skepticism, as we commonly use the term, deals with the evaluation of falsifiable (not necessarily *testable*) truth claims by generally positivist and empirical means. When such means cannot decide the value of a truth claim, this does not imply that the skeptic is enjoined from forming an opinion or constrained to do nothing. Fagin urges his readers to take into account evidence from history, yet he fails to mention that this evidence is conflicting and does not necessarily support his conclusion that political action is ineffective. . . .

Stan Dierking
Colorado Springs, Colo.

Barry Fagin's Libertarian testimonial was an interesting read but it really belonged in the Forum section or perhaps even the Letters to the Editor. It hardly qualified as an article for the main body of the magazine.

Fagin begins by admitting that "the testability of political hypotheses is extremely low due to the difficulty of controlled experimentation." He then contradicts this statement and informs us that "[t]he theory of public choice, developed by the economist James Buchanan, generates testable predictions about the behavior of political institutions" and that this public choice theory "suggests" that, "when compared with market failure, political failure is both much more likely and much more difficult to correct."

This is a thin thread on which to hang a Libertarian attack on the use of government programs to correct market failures and ameliorate negative market consequences. I, for one, do not buy Fagin's arguments. And I'm amazed that something with such an obvious personal political agenda was given such a prominent place in the magazine.

John C. Reiger
Sacramento, Calif.

Barry Fagin claims that "liberals hold an almost religious belief in the effectiveness of government as a social tool." I would reply that the Libertarians and Republicans praised by Mr. Fagin hold an almost reli-

gious belief in the ineffectiveness of government as a social tool—and neither his statement nor mine have anything whatsoever to do with the kind of subjects CSICOP should train its skeptical eye upon: paranormal and pseudoscientific quackery. If the SKEPTICAL INQUIRER becomes a platform for diatribes from either the political right or left, then it's missing its mission.

Gloria J. Leitner
Boulder, Colo.

Jeane Dixon

Regarding the recent passing of Jeane Dixon ("Psychic Vibrations," May/June 1997), I made a presentation in 1979 at a conference on holistic medicine sponsored by a Pittsburgh, Pennsylvania, hospital. The conference was held near a ski resort about an hour east of the city. My host met me and one other speaker, Jeane Dixon, at the airport and drove both of us to the resort. Upon arrival, Dixon and I were assigned the same day suite in which to rest and prepare. We were together there for six to eight hours, plus I attended her presentation, and then we were driven back to the airport together.

Dixon was from Loma Linda's neighboring city, San Bernardino, California, and at the time, her sister "Pinky," whom I had met, owned and operated the Loma Linda Airport. I was born in the Washington, D.C., area where Dixon resided, so getting acquainted was quite easy. We talked continuously during the entire time and, although I challenged the whole notion of psychic powers, we parted friends. She tried to win me over, but her methods (flattery and appeal to personal subjectivity) were so transparent—thanks to my training under Ray Hyman—that her efforts were futile.

I learned a few things worth knowing about Ms. Dixon. First, she did not make the predictions attributed to her in *The Star*. She told me that she merely sold the use of her name to the paper and that ghost writers made up the predictions attributed to her. She considered the predictions made in her name frivolous, harmless entertainment. Another feature of her modus operandi was that she was always taking informal opinion polls. In the fall of 1979 we were approaching an election year. She was asking everyone their views on potential candidates. She probed deeply and asked about regions represented and so forth. She stated that when she made a "prediction," it was predicated on the conditions of the moment (e.g., "if the election were held today"); however, when she made a "forecast," it was something that was going to happen in the future. These were always vague, because her concept of the event was vague.

What she was doing was no more than what any of us would do if asked to make guesses about future events. She just had the chutzpa to go public with these. She functioned very much like an oracle in ancient times. She read the stars and other natural signs, believing that God knows the future and communicates it to anyone willing to look. She used the classic dodge that the stars impel, not compel, but certainly held that humans are more at the mercy of fate than captains of our destinies. I came away seeing her as far more normal than her public persona suggested, and less of a mystic than even *SI* would project.

I see her as far less dangerous than the "psychic friends" who function as psychological counselors (for a fee) over the telephone. I hope *SI* will continue to report on the latter group and keep asking why society tolerates mental health quackery on this scale.

William Jarvis, Ph.D.
President, National Council
Against Health Fraud
Professor of Public Health
and Preventive Medicine
Loma Linda University Schools
of Public Health and Medicine
Loma Linda, Calif.

Popularizers Penalized

In his tribute to Carl Sagan (March/April 1997), John Allen Paulos contends that "fear of being labeled a popularizer . . . is based on a confusion." Oh? It may be true that the National Academy of Sciences, "the nation's most august group of scientists," once presented to Sagan its Public Welfare Medal to honor his "extraordinary use of science for the public good" (p. 6, same issue). But as for accepting him for NAS membership, Sagan the "popularizer" had about as much chance as Bill Nye, "The Science Guy." NAS member Stephen Jay Gould, in his January 31 *Science* magazine editorial, "Bright Star Among Billions," labels NAS's "rejection" of Sagan "a shameful incident" that "hurt [Sagan] deeply." The real "confusion," it seems, resides within the elitist minds of Gould's ivory-tower colleagues.

Gary P. Posner, M.D.
Founder, Tampa Bay Skeptics
Tampa, Fla.

Clarifying 'Nonlocality'

In your May/June issue you published a letter by Donald B. Brady that referred to my article "Quantum Quackery" in the January/February issue and called for a discussion of the "nonlocality" implied by certain experimental tests of quantum mechanics. Unfortunately, my response, along with the letter from R. H. Davis, may have left your reader more confused than before. Let me try to clarify the matter.

First, I do not think there is any basic conceptual disagreement in the three letters. I am very grateful for Davis's kind remarks about my work and agree completely with his summary of the theoretical and experimental situation. Similarly, I do not think Brady was off-base in his remarks.

However, confusion may have arisen from our different uses of the term *nonlocality*. In my letter and book, *The Unconscious Quantum*, I restrict *nonlocality* to apply to causally connected events outside the light cone, that is, those implying superluminal motion or communication. I believe this is consistent with Einstein's usage. I used the term *inseparability* to refer to the spacelike connections inferred by experiments that are not necessarily causal. Brady and Davis, following most of the popular literature, use *nonlocality* in the broader sense to include both noncausal and causal connections outside the light cone. It is important to make this distinction because that is where the mysticism comes in. Again, the point is that no observations indicate any violation of either relativity or quantum mechanics, as they have been interpreted for almost a century, and no cause for claiming that quantum mechanics supports mysticism.

I would also like to clarify my comment

on the use of another word by Brady: *corporealism*. This, of course, is in the dictionary. It was his term *naive corporealism* that I questioned.

Victor J. Stenger
Professor of Physics
University of Hawaii
Honolulu, Hawaii

UFOs—A 'Cosmic' Solution

I am constantly amazed and amused by reports of UFO sightings and encounters. As one who has read comic books for forty years, and written and drawn them professionally for almost twenty-five, I have no difficulty guessing where these little green (or is it gray now?) men come from, other than the hyperactive imaginations of credulous humans.

The oversized heads, the diminutive bodies, the spindly arms and legs, all ferried about in ships of much more advanced technology than we presently command, speak instantly to me of one thing: time-travelers.

What is interesting about the notion that these little green men are visitors from our own posterity is how very much better it serves to explain the behavior of these alleged extraterrestrials than anything the most ardent UFOlogists can suggest. Why aliens would abduct humans for medical research and breeding experiments is a mystery. To borrow a line from science fiction writer Larry Niven, a human would have greater success attempting to mate with an ear of corn (given the common terrestrial origin and presumed common ancestor) than with any off-world paramour. Ah, but *humans* from the *future* would be a different matter!

The necessary match of genetic ancestry is met, and so is another possible motive: selfishness. They are here to help us avoid the missteps that ended up making their distant future world the unpleasant place it must surely be to necessitate gray skin and bulbous, unblinking eyes.

Now if I could just convince myself this all made sense somewhere outside the pages of a comic book adventure. . . .

John Byrne
Writer/Artist
Wonder Woman
Jack Kirby's Fourth World

Politically Incorrect

If anyone still believes that graduation from a distinguished Ivy League university is proof against gross scientific illiteracy, he should have been tuned in to Bill Maher's *Politically Incorrect* program the night Joe Nickell was on. Maher, after informing us that psychics were "for real" and that astrology and numerology really did work, blurted out the most remarkable rhetorical question I have ever heard in public, even from the psychic community itself. "Tell us anything," he asked, "that science has ever given us?" With preternatural restraint and courtesy, Joe Nickell offered, "We could try the elimination of smallpox, for starters." Had Nickell and the formidable Steve Allen not been there, there is no telling where this discussion may have led, as Eddie Fisher's amusing daughter chimed in to reveal that her bedroom is being haunted by the ghost of the late figure skater Sonja Henie. I have always recognized this talk show host as basically a sophomoric, comedy-club scatologist with pretensions to sophisticated chatter, but I have never before fully plumbed the sea-floor depth of his ignorance. Since he is a much-touted graduate of Cornell University, I extend my belated condolences to our late, great Carl Sagan, whom I swear I heard groaning audibly from somewhere in outer space.

Robert Owen
San Jose, Calif.

X-Files Cover

In your May/June issue, Greg Freeman (Letters) complained about your January/February *X-Files* cover, implying that this was just a cheap ploy to get the magazine noticed. In my view this is just the sort of thing you *should* be doing! For many years I had heard rumors that a magazine called SKEPTICAL INQUIRER existed but I had never seen a copy. I began to wonder if it was some sort of mythical beast like the Loch Ness Monster or Bigfoot. Then one day I was browsing around an SF/fantasy shop that sells anything with *The X-Files* on the cover and there it was—your January/February 1997 issue. I bought it and became a subscriber. Maybe I'm not the only one—it would be interesting to know if sales of that issue were higher than normal. If so then that cover did a good job.

Robin Davies
Hertford, Herts
U.K.

An Honest Horoscope

Lookee what I found! My local newspaper's (*Waco Tribune-Herald*, Texas) horoscope column runs with the disclaimer: "Astrology has no basis in science. This column is printed for its entertainment value only."

Apparently the message of the skeptics is getting through. It's nice to see an *honest* horoscope column for a change. (Hmmm, does that last sentence contain an oxymoron?)

Phil Senter
Waco, Texas

CD-ROM Encyclopedias

In your November/Dececember 1996 issue, Eugene Emery ("Media Watch") decried the coverage of pseudoscience and the paranormal in CD-ROM encyclopedias. My own children, like the students he mentions, turn to *Encarta* first when doing their school homework, but they used to find that it was mostly about the USA and had strange spelling! Happily, there is now an *Encarta 1997 World English Edition*, designed, I believe, for the rest of the world. I was asked to write the section on parapsychology, and I hope I have provided a fair and informative introduction.

Dr. Susan Blackmore
Department of Psychology
University of the West
of England
St. Matthias College
Bristol, U.K.

The letters coloumn is a forum for views on the matters raised in previous issues. Letters should be no more than 250 words. Due to the volume of letters, not all can be published. They should be typed double-spaced. Address: Letters to the Editor, SKEPTICAL INQUIRER, 944 Deer Dr. NE, Albuquerque, NM 87122.

THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL

AT THE CENTER FOR INQUIRY–INTERNATIONAL (ADJACENT TO THE STATE UNIVERSITY OF NEW YORK AT BUFFALO)
AN INTERNATIONAL ORGANIZATION

Network of Affiliated Organizations

International

ARGENTINA. CAIRP, Director, Ladislao Enrique Márquez, Casilla de Correo 26, suc. 25, 1425, Buenos Aires.

AUSTRALIA. National: **Australian Skeptics,** Contact: Barry Williams, Executive Officer, P.O. Box 268, Roseville, NSW 2069, (Phone: 61 2 9417 2071, Fax: 61 2 9417 7930, E-mail: skeptics@spot.tt.sw.oz.au). Regional: **Australian Capital Territory,** P.O. Box 555, Civic Square, 2608. **Hunter Skeptics,** (formerly Newcastle), P.O. Box 166, Waratah NSW 2298. **Darwin Skeptics (Northern Territory),** P.O. Box 809, Sanderson NT 0812. **Queensland,** P.O. Box 6454, Fairfield Gardens QLD 4103. **South Australia,** P.O. Box 91, Magill, 5072. **Tasmanian Skeptics,** 97 Gillon Crescent, Mount Stuart TAS 7000. **Victoria,** P.O. Box 5166AA, Melbourne, VIC 3001. **Western Australia,** P.O. Box 899, Morley WA 6062.

BELGIUM. Committee Para, J. Dommanget, Chairman, Observatoire Royal de Belgique, Avenue Circulaire 3, B-1180 Brussels. **SKEPP,** W. Betz, Secretary, Laarbeeklaan 103, B1090 Brussels (Fax: 32-2-4774301).

BRAZIL. Opcão Racional, Luis Gutman, Rua Santa Clara, 431, Bloco 5, Apt. 803, Copacabana - Rio de Janeiro 22041-010 (+55-21-547-2088 or +55-21-235-2476).

BULGARIA. Bulgarian Skeptics, Contact: Wladimir Daskalow, Krakra 22, BG-1504 Sofia, Bulgaria.

CANADA. Alberta Skeptics, Heidi Lloyd-Price, Secretary, P.O. Box 5571, Station A, Calgary, Alberta T2H 1X9. **British Columbia Skeptics,** Contact: Lee Moller, 1188 Beaufort Road, Vancouver V7G 1R7. **Ontario Skeptics,** Henry Gordon, Chairman, 343 Clark Ave West, Suite 1009, Thornhill Ontario L4J 7K5 (E-mail: hgordon@idirect.com). **Sceptiques du Quebec**: Donald Gilbert, C.P. 202, Succ. Beaubien, Montreal H2G 3C9 (E-mail: sceptiq@ibm.net, Web: libertel.montreal.qc.ca/info/sceptiques).

CHINA. China Association for Science and Technology, Contact: Shen Zhenyu, Research Center, CAST, PO Box 8113, Beijing, China. **Chinese Skeptics Circle,** Contact: Wu Xianghong, Box 4-doctor, Renmin Univ. of China, Beijing 100872.

CZECH REPUBLIC. Czech Club of Skeptics, Dr. Ivan David, Vozova 5, Prague 3, 73000, The Czech Republic.

ESTONIA. Contact: Indrek Rohtmets, Horisont, EE 0102 Tallinn, Narva mnt. 5.

EUROPEAN COUNCIL OF SKEPTICAL ORGANIZATIONS. Amardeo Sarma,* Secretary, Postfach 1222, D-64374 Rossdorf (Fax: +49 6154 81912).

FINLAND. Skepsis, Ilpo V. Salmi, President. Secretary and contact person: Anneli Aurejdrvi, Sireenitie 10b A2, FIN-01390 Vantaa, Finland. E-mail contact: Sami Hiltunen, sjhiltun@cc.helsinki.fi.

FRANCE. Cercle Zététique, Contact: Paul-Eric Blanrue, 12 Rue David Deitz, 57000 Metz. **Comite Francais pour l'Etude des Phenomenes Paranormaux,** Claude Benski, Secretary-General, Merlin Gerin, RGE/A2 38050 Grenoble Cedex. **Union Rationaliste,** Contact: Jean-Paul Krivine, 14, Rue de l'Ecole Polytechnique, 75005 Paris.

GERMANY. Society for the Scientific Investigation of Para-Science (GWUP), Amardeo Sarma,* Convenor, Postfach 1222, D-64374 Rossdorf (Phone: +49 6154 695021, Fax: +49 6154 695022, E-mail: info@gwup.org).

HONG KONG. Hong Kong Skeptics. Contact: Rebecca Bradley, P.O. Box 1010, Shatin Central Post Office, Shatin, NT.

HUNGARY. Hungarian Skeptics, Gyula Bencze, *Termeszet Vilaga,* P.O. Box 25, Budapest 8,1444. (Fax: 011-36-1-118-7506).

INDIA. Indian Skeptics, B. Premanand, Chairman, 10 Chettipalayam Rd., Podanur 641-023 Coimbatore Tamil Nadu. **Indian Rationalist Association,** Contact: Sanal Edamaruku, 779, Pocket 5, Mayur Vihar 1, New Delhi 110 091. **Maharashtra Superstition Eradication Committee,** Contact: Narendra Dabholkar, 155 Sadashiv Peth, Satara–415 001. **Dravidar Kazhagam,** K. Veeramnani, General Secretary, Periyar Thidal, 50, E.V.K. Sampath Road, Madras - 600 007, Tamil Nadu.

IRELAND. Irish Skeptics, Contact: Peter O'Hara, St. Joseph's Hospital, Limerick.

ISRAEL. Israel Skeptics Society, Philip Marmaros, Chairman, P.O. Box 8481, Jerusalem. (Fax: 972-2-611976, E-mail: virtual@aquanet.co.il).

ITALY. CICAP (Comitato Italiano per il Controllo delle Affermazioni sul Paranormale), P.O. Box 1117, 35100 Padova. *Scienza & Paranormale,* Massimo Polidoro, Editor, P.O. Box 60, 27058 Voghera (PV). (Tel. Fax: 39-426-22013.)

JAPAN. Japan Skeptics, Jun Jugaku, Chairperson, Business Center for Academic Societies Japan, 16-9 Honkomagome 5-chome, Bunkyo-Ku, Tokyo 113.

KAZAKHSTAN. Kazakhstan Commission for Investigation of Anomalous Phenomena (KCIAP), Contact: Sergey Efimov, Astrophysical Institute, Kamenskoye Plato, Alma-Ata 480068, Kazakhstan.

MEXICO. Mexican Association for Skeptical Research (SOMIE), Mario Mendez Acosta*, Chairman, Apartado Postal 19-546, Mexico 03900, D.F.

NETHERLANDS. Stichting Skepsis, Rob Nanninga, Secretary, Westerkade 20, 9718 AS Groningen.

NEW ZEALAND. New Zealand Skeptics, Bernard Howard, Secretary, 150 Dyer's Pass Rd., Christchurch 2, N.Z. Vickie Hyde, Chairperson, South Pacific Information Services, Box 19-760, Christchurch 5, N.Z. Fax: +64 (03) 385-5138. E-mail: nzsm@spis.co.nz. Web: http://www.spis.co.nz/skeptics.htm.

NORWAY. Skepsis, St. Olavsgt. 27, N-0166, Oslo.

RUSSIA. Contact: Dr. Valery A. Kuvakin, Zdravyi Smysl (Common Sense), 117421 Russia, Moscow, Novatorov 18-2-2.

SLOVAK REPUBLIC. Society for Advocacy of Critical Thinking (SACT), Igor Kapisinsky, Secretary, Dostojevského rad 13, 811 09 Bratislava, Slovak Republic.

SOUTH AFRICA. Assn. for the Rational Investigation of the Paranormal (ARIP), Marian Laserson, Secretary, P.O. Box 46212, Orange Grove, 2119 South Africa. **SOCRATES,** Contact: L.W. Retief, P.O. Box 10240, Welgedact, Bellville 7530, South Africa, E-mail: leonr@iafrica.com.

SPAIN. Alternativa Racional a las Pseudociencias (ARP). Carlos Telleria, Executive Director, Apdto. 1516, 50080 Zaragoza. **El Investigador Esceptico.** Contact: Felix Ares De Blas, Gámez/Ares/Martinez, P.O. Box 904, 20080 Donostia-San Sebastian.

SWEDEN. Vetenskap och Folkbildning (Swedish Skeptics), Sven Ove Hansson, Secretary, Box 185, 101 23 Stockholm.

TAIWAN. Tim Holmes, P.O. Box 195, Tanzu, Taiwan.

UNITED KINGDOM. SKEPTICAL INQUIRER Representative, Michael J. Hutchinson, 10 Crescent View, Loughton, Essex IG10 4PZ. **The Skeptic** magazine, Editors, Toby Howard and Steve Donnelly, P.O. Box 475, Manchester M60 2TH. (E-mail: toby@cs.man.ac.uk). **Wessex Skeptics,** Robin Allen, Dept. of Physics, Southampton Univ., Highfield, Southampton S09 5NH.

United States

ALABAMA. Alabama Skeptics, Emory Kimbrough, 3550 Watermelon Road, Apt. 28A, Northport, AL 35473 (205-759-2624).

ARIZONA. Tucson Skeptics Inc. James McGaha, Chairman, 5100 N. Sabino Foothills Dr., Tucson, AZ 85715, E-mail: JMCGAHA@PimaCC.Pima.EDU. **Phoenix Skeptics,** Michael Stackpole, Chairman, P.O. Box 60333, Phoenix, AZ 85082.

CALIFORNIA. Bay Area Skeptics, Wilma Russell, Secretary,17722 Buti Park Court, Castro Valley, CA 94546. **East Bay Skeptics Society,** Daniel Sabsay, President, P.O. Box 20271, Oakland, CA 94620 (510-420-0702). **Sacramento Skeptics Society,** Terry Sandbek, 3550 Watt Ave., Suite 3, Sacramento, CA 95821 (916-488-3772), E-mail: tsandbek.mother.com. **San Diego Association for Rational Inquiry,** Contact: Bruce R. Wallace, 945 Fourth Avenue, San Diego, CA 92101 (619-233-1888, Fax: 619-696-9476).

COLORADO. Rocky Mountain Skeptics, Béla Scheiber,* President, P.O. Box 7277, Boulder, CO 80306 (Tel.: 303-444-5368, Web: bcn.boulder.co.us/community/rms).

CONNECTICUT. Connecticut Skeptical Society, Contact: Steven Novella, MD, P.O. Box 456, Cheshire, CT 06410-0456, E-mail: 74267.2453@compuserve.com.

D.C. Capital Area. National Capital Area Skeptics, c/o D.W. "Chip" Denman, 8006 Valley Street, Silver Spring, MD 20910.

FLORIDA. Tampa Bay Skeptics, Gary Posner, 1113 Normandy Trace Rd., Tampa, FL 33602 (813-221-3533), E-mail: garypos@aol.com, Web address: members.aol.com/tbayskept/tbs.html.

GEORGIA. Georgia Skeptics, Becky Long, President, 2277 Winding Woods Dr., Tucker, GA 30084.

ILLINOIS. Rational Examination Assoc. of Lincoln Land (REALL), David Bloomberg, Chairman, P.O. Box 20302, Springfield IL 62708 (217-522-7554).

INDIANA. Indiana Skeptics, Robert Craig, Chairperson, 5401 Hedgerow Drive, Indianapolis, IN 46226.

KENTUCKY. Kentucky Assn. of Science Educators and Skeptics (KASES), Chairman, Prof. Robert A. Baker, 3495 Castleton Way North, Lexington, KY 40502.

LOUISIANA. Baton Rouge Proponents of Rational Inquiry and Scientific Methods (BR-PRISM), Dick Schroth, Director, 425 Carriage Way, Baton Rouge, LA 70808-4828 (504-766-4747).

MASSACHUSETTS. Skeptical Inquirers of New England. Contact: Laurence Moss, Ho & Moss, 68 Harrison Ave., 5th Floor, Boston, MA 02111.

MICHIGAN. Great Lakes Skeptics, Contact: Carol Lynn, 1264 Bedford Rd., Grosse Pointe Park, MI 48230-1116. **Tri-Cities Skeptics,** Contact: Gary Barker, 3596 Butternut St., Saginaw, MI 48604 (517-799-4502), E-mail: gary@earthvision.svsu.edu.

MINNESOTA. Minnesota Skeptics, Robert W. McCoy, 549 Turnpike Rd., Golden Valley, MN 55416. **St. Kloud ESP Teaching Investigation Committee** (SKEPTIC), Jerry Mertens, Coordinator, Psychology

Dept., St. Cloud State Univ., St. Cloud, MN 56301.

MISSOURI. Kansas City Committee for Skeptical Inquiry, Verle Muhrer, Chairman, United Labor Building, 6301 Rockhill Road, Suite 412, Kansas City, MO 64131. **Gateway Skeptics,** Chairperson, Steve Best, 6943 Amherst Ave., University City, MO 63130.

NEW HAMPSHIRE. Skeptics Resource Center, Contact: J. J. Kane, 89 Glengarry Dr., Stratham, NH 03885 (603-778-6873).

NEW MEXICO. New Mexicans for Science & Reason, John Geohegan, Chairman, 450 Montclaire SE, Albuq., NM 87108; Dave Thomas, Vice President, PO Box 1017, Peralta, NM 87042.

NEW YORK. Inquiring Skeptics of Upper New York (ISUNY), Contact: Michael Sofka, 8 Providence St., Albany, NY 12203. (518-437-1750). **New York Area Skeptics** (NYASk), Contact: Alan Weiss, 44 Parkview Drive, Millburn, NJ 07041, E-mail: nyask@liii.com. **Western New York Skeptics,** Tim Madigan, Chairman, 3965 Rensch Road., Buffalo, NY 14228.

OHIO. South Shore Skeptics, Page Stephens, P.O. Box 5083, Cleveland, OH 44101 (216-676-4859). E-mail: hpst@earthlink.net. **Association for Rational Thinking** (Cincinnati area), Joseph F. Gastright, Contact, 111 Wallace Ave., Covington, KY 41014 (606-581-7315). **Central Ohioans for Rational Inquiry** (CORI), Michael S. Lehv, President, 78 Park Drive, Columbus, OH 43209 (Fax: 614-258-1954).

OREGON. Oregonians for Rationality, John Reese, Secretary, 7555 Spring Valley Rd NW, Salem, OR 97304 (503) 364-6676, E-mail: joshr@ncn.com.

PENNSYLVANIA. Paranormal Investigating Committee of Pittsburgh (PICP), Richard Busch, *Chairman, 8209 Thompson Run Rd., Pittsburgh, PA* 15237 (412-366-4663), E-mail: Mindful@diamond.nb.net. **Philadelphia Association for Critical Thinking** (PhACT), Bob Glickman, President, PO Box 21970 Philadelphia, PA 19124 (215-533-4677), Web: http://www.voicenet.com/~eric/phact.

TENNESSEE. Reality Fellowship, Contact: Carl Ledendecker, 2123 Stonybrook Rd., Louisville, TN 37777.

TEXAS. Houston Association for Scientific Thinking (HAST), Darrell Kachilla, P.O. Box 541314, Houston, TX 77254. **North Texas Skeptics,** Joe Voelkering, President, P.O. Box 111794, Carrollton, TX 75011-1794.

WASHINGTON. The Society for Sensible Explanations, P.O. Box 7121, Seattle, WA 98133-2121. Tad Cook, Secretary. (E-mail: tad@ssc.com).

WISCONSIN. Contact: Mike Neumann, 1835 N. 57th Street, Milwaukee, WI 53208 (414-453-7425, Fax: 414-873-4446).

**Member, CSICOP Executive Council*
°Associate Member, CSICOP Executive Council

The organizations listed above have aims similar to those of CSICOP but are independent and autonomous. Representatives of these organizations cannot speak on behalf of CSICOP. Please send updates to Barry Karr, P.O. Box 703, Amherst, NY 14226-0703.

SCIENTIFIC AND TECHNICAL CONSULTANTS

George Agogino, Dept. of Anthropology, Eastern New Mexico University

Bill G. Aldridge, executive director, National Science Teachers Assoc.

Gary Bauslaugh, educational consultant, Center for Curriculum, Transfer and Technology, Victoria, British Columbia, Canada

Richard E. Berendzen, astronomer, Washington, D.C.

Martin Bridgstock, lecturer, School of Science, Griffith University, Brisbane, Australia

Richard Busch, *magician, Pittsburgh, Pa.*

Shawn Carlson, physicist, San Diego, Calif.

Charles J. Cazeau, geologist, Deary, Idaho

Ronald J. Crowley, professor of physics, California State University, Fullerton

Roger B. Culver, professor of astronomy, Colorado State Univ.

Felix Ares de Blas, professor of computer science, University of Basque, San Sebastian, Spain

Michael R. Dennett, writer, investigator, Federal Way, Washington

Sid Deutsch, visiting professor of electrical engineering, University of South Florida, Tampa

J. Dommanget, astronomer, Royale Observatory, Brussels, Belgium

Nahum J. Duker, assistant professor of pathology, Temple University

Barbara Eisenstadt, psychologist, educator, clinician, East Greenbush, N.Y.

John F. Fischer, forensic analyst, Orlando, Fla.

Frederic A. Friedel, philosopher, Hamburg, West Germany

Robert E. Funk, anthropologist, New York State Museum & Science Service

Eileen Gambrill, professor of social welfare, University of California at Berkeley

Sylvio Garattini, director, Mario Negri Pharmacology Institute, Milan, Italy

Laurie Godfrey, anthropologist, University of Massachusetts

Gerald Goldin, mathematician, Rutgers University, New Jersey

Donald Goldsmith, astronomer; president, Interstellar Media

Clyde F. Herreid, professor of biology, SUNY, Buffalo

Terence M. Hines, professor of psychology, Pace University, Pleasantville, N.Y.

Michael Hutchinson, author; SKEPTICAL INQUIRER representative, Europe

Philip A. Ianna, assoc. professor of astronomy, Univ. of Virginia

William Jarvis, professor of health promotion and public health, Loma Linda University, School of Public Health

I. W. Kelly, professor of psychology, University of Saskatchewan

Richard H. Lange, M.D., Mohawk Valley Physician Health Plan, Schenectady, N.Y.

Gerald A. Larue, professor of biblical history and archaeology, University of So. California.

Bernard J. Leikind, staff scientist, GA Technologies Inc., San Diego

William M. London, Director of Public Health at the American Council of Science and Health

Thomas R. McDonough, lecturer in engineering, Caltech, and SETI Coordinator of the Planetary Society

James E. McGaha, Major, USAF; pilot

Joel A. Moskowitz, director of medical psychiatry, Calabasas Mental Health Services, *Los Angeles.*

Jan Willem Nienhuys, mathematician, Univ. of Eindhoven, the Netherlands

Robert B. Painter, professor of microbiology, School of Medicine, University of California

John W. Patterson, professor of materials science and engineering, Iowa State University

Steven Pinker, professor and director of the Center for Cognitive Neuroscience, MIT

James Pomerantz, Provost, and professor of cognitive and linguistic sciences, Brown Univ.

Gary P. Posner, M.D., Tampa, Fla.

Daisie Radner, professor of philosophy, SUNY, Buffalo

Michael Radner, professor of philosophy, McMaster University, Hamilton, Ontario, Canada

Robert H. Romer, professor of physics, Amherst College

Milton A. Rothman, physicist, Philadelphia, Pa.

Karl Sabbagh, *journalist, Richmond, Surrey,* England

Robert J. Samp, assistant professor of education and medicine, University of Wisconsin-Madison

Amardeo Sarma,° project supervisor, EURESCOM; executive director, GWUP, Germany

Steven D. Schafersman, asst. professor of geology, Miami Univ., Ohio

Béla Scheiber,* system analyst, Boulder, Colo.

Chris Scott, statistician, London, England

Stuart D. Scott, Jr., associate professor of anthropology, SUNY, Buffalo

Erwin M. Segal, professor of psychology, SUNY, Buffalo

Steven N. Shore, associate professor and chair, Dept. of Physics and Astronomy, Indiana Univ. South Bend

Barry Singer, psychologist, Eugene, Oregon

Mark Slovak, astronomer, University of Wisconsin-Madison

Waclaw Szybalski, professor, McArdle Laboratory, University of Wisconsin-Madison

Ernest H. Taves, psychoanalyst, Cambridge, Massachusetts

Sarah G. Thomason, professor of linguistics, University of Pittsburgh

Neil deGrasse Tyson, astrophysicist, *Princeton University and the Hayden* Planetarium

Richard Wiseman, Senior Research Fellow in psychology, University of Hertfordshire

CSICOP Subcommittees

Astrology Subcommittee: Chairman, I. W. Kelly, Dept. of Educational Psychology, 28 Campus Drive, Saskatoon, Sask., Canada. S7N-OX1

Council for Media Integrity: Network Director, Etienne C. Rios, CSICOP, P.O. Box 703, Amherst, NY 14226-0703.

Health Claims Subcommittee: Co-chairmen, William Jarvis, Professor of Health Promotion and Education, School of Public Health, Loma Linda University, Loma Linda, CA 93350, and Stephen Barrett, M.D., P.O. Box 1747, Allentown, PA 18105.

Parapsychology Subcommittee: Chairman, Ray Hyman, Psychology Dept., Univ. of Oregon, Eugene, OR 97402.

UFO Subcommittee: *Chairman, Philip J.* Klass,* 404 "N" Street S.W., Washington, D.C. 20024.

*Member, CSICOP Executive Council
°Associate Member, CSICOP Executive Council

This is one of the first pictures taken by the camera on the Mars Pathfinder lander shortly after its touchdown at 10:07 AM Pacific Daylight Time on July 4, 1997. The small rover, named Sojourner, is seen in the foreground in its position on a solar panel of the lander. The white material on either side of the rover is part of the deflated air bag system used to absorb the shock of the landing. Between the rover and the horizon is the rock-strewn martian surface. Two hills are seen in the right distance, profiled against the light brown sky. (NASA/JPL/Caltech)

CENTER FOR INQUIRY INTERNATIONAL

P.O. BOX 703, AMHERST, NY 14226
(716) 636-1425

CENTER FOR INQUIRY– ROCKIES
P.O. Box 2019, Boulder, CO 80306
Tel.: (303) 444-5368 • Fax: (303) 447-8412

CENTER FOR INQUIRY– MIDWEST
United Labor Building
6301 Rockhill Rd., Suite 412
Kansas City, MO 64131
Tel.: (816) 822-9840

CENTER FOR INQUIRY– WEST
5521 Grosvenor Ave., Los Angeles, CA 90066
Tel.: (310) 306-2847 • Fax: (310) 821-2610

CENTER FOR INQUIRY– MOSCOW
Professor Valerii A. Kuvakin
117421 Russia, Moscow, Novatorov 18-2-2

The Committee for the Scientific Investigation of Claims of the Paranormal encourages the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and disseminates factual information about the results of such inquiries to the scientific community and the public. It also promotes science and scientific inquiry, critical thinking, science education, and the use of reason in examining important issues. To carry out these objectives the Committee:

- Maintains a network of people interested in critically examining paranormal, fringe-science, and other claims, and in contributing to consumer education
- Prepares bibliographies of published materials that carefully examine such claims
- Encourages research by objective and impartial inquiry in areas where it is needed
- Convenes conferences and meetings
- Publishes articles that examine claims of the paranormal
- Does not reject claims on a priori grounds, antecedent to inquiry, but examines them objectively and carefully

The Committee is a nonprofit scientific and educational organization.
The SKEPTICAL INQUIRER is its official journal.

Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON

The Committee for the Scientific Investigation of Claims of the Paranormal